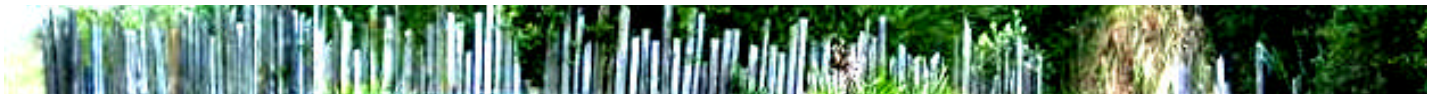

JUNE 2002

OTATARA PA HISTORIC RESERVE NAPIER

CONSERVATION PLAN

Lynda Walter and Derek Gosling

Department of Conservation
Te Papa Atawhai

Otatara Pa Historic Reserve
Napier
Conservation Plan

Including a specification for remedial work & regular maintenance

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1.0 INTRODUCTION

1.1 PURPOSE

This plan prescribes regular maintenance and remedial works to assist in the conservation of the archaeological and cultural landscape located at the Otatara Pa Historic Reserve. The purpose is to care for these archaeological features so that their meaning and importance is conserved and able to be interpreted for present and future generations. The archaeological features within Otatara Pa Historic Reserve have considerable cultural significance to Ngati Kahungunu, and in particular, Ngati Paarau of Waiohiki Marae, who are kaitiaki of Otatara. The reserve should be managed and conserved in a manner consistent with the cultural and spiritual values of the tangata whenua.

Otatara Pa Historic Reserve is situated on the Redcliffe hills on the left bank of the Tutaekuri River (Figure 1). It is adjacent to the Eastern Institute of Technology (EIT) at Taradale, Napier, Hawkes Bay. The reserve can be accessed from either Springfield Road or Churchill Drive (Conservation Management Plan, 2001:13).

Visible surface archaeological features occur over approximately 44 hectares, not all of which are included in the Otatara Pa Historic Reserve. The surface features consist of numerous pits and terraces and two pa, a lower one called Otatara, and an upper one called Hikurangi. Otatara Pa proper has been almost totally quarried away, however the locality (including the area of Hikurangi Pa), has become known as "Otatara". The name is used throughout this conservation plan to refer to the archaeological complex that represents a significant cultural landscape.

This conservation plan should be used in conjunction with two companion documents. *Otatara Pa Historic Reserve Conservation Management Plan* (2001) and the *Assessment of Heritage Significance – Otatara Pa Historic Reserve* (1997). The latter document was prepared for the Department of Conservation by Elizabeth Pishief, and provides a comprehensive heritage description and significance assessment. Accordingly, the comparable sections of this conservation plan refer the reader to the earlier (1997) document.

1.2 EXECUTIVE SUMMARY

Otatara Pa Historic Reserve is currently managed by the Department of Conservation, East Coast-Hawkes Bay Conservancy.

Otatara Pa Historic Reserve is a place of cultural significance to Ngati Kahungunu, and in particular to Ngati Paarau of Waiohiki, who are kaitiaki for Otatara. Ngati Paarau has a vision for Otatara, including aspirations and an expectation of continuing cultural use.

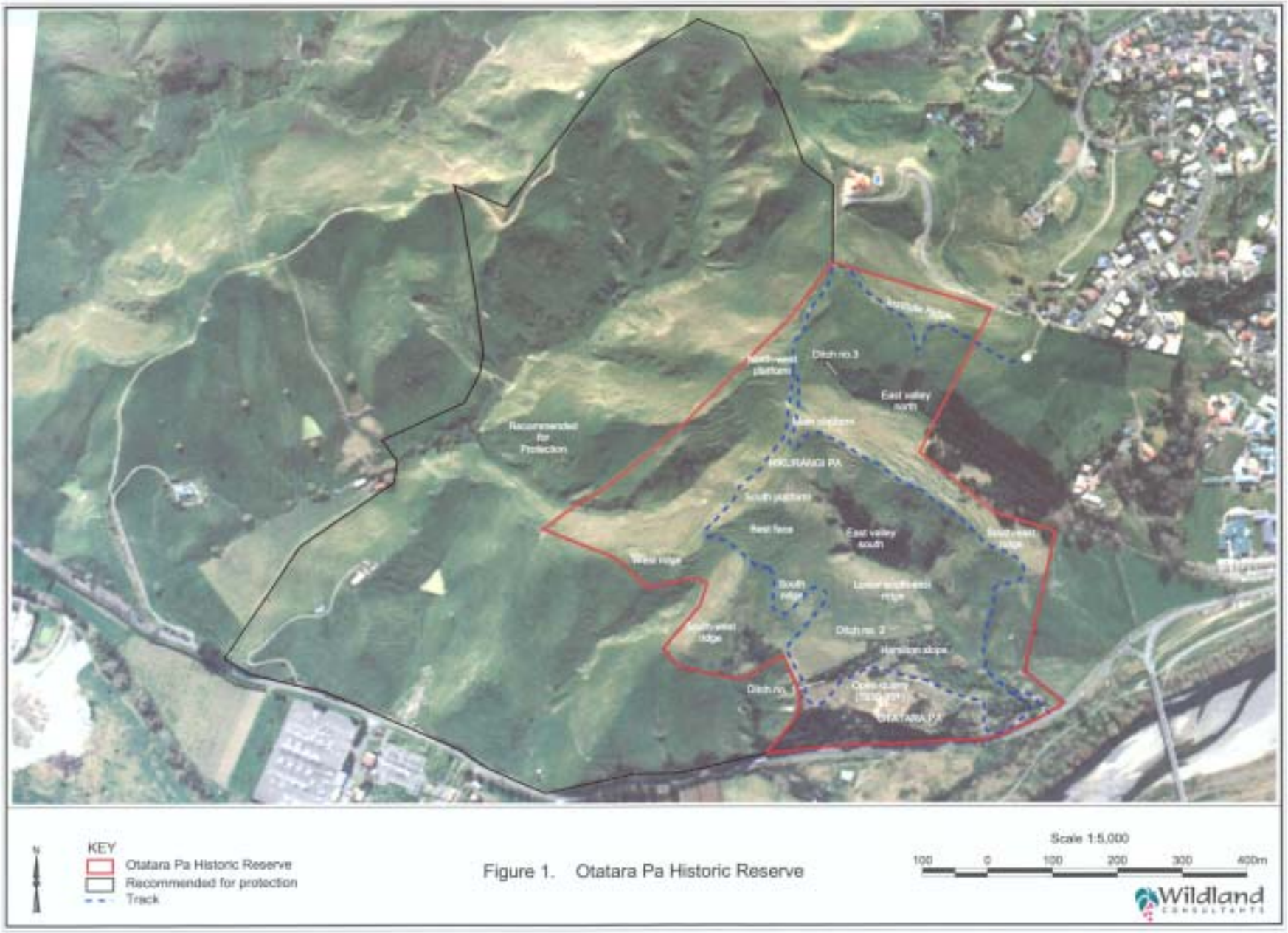

Figure 1. Otatara Pa Historic Reserve

In 1990 a pilot Conservation Corps project, run by the Waiohiki Marae Committee, started reserve enhancement works at Otatara Pa Historic Reserve. One aspect of this project was the construction of 3.5+ metre high palisades on the quarried portion of Otatara Pa as an interpretation of a defensive structure. Several large pou were erected at the southern and northern ends of the reserve. These structures have become a feature of the reserve. The palisades and pou represent continuity of cultural use.

Otatara Pa Historic Reserve contains a portion of an extensive cultural landscape that covers approximately 44 hectares. Significant archaeological features including pits, terraces, cultivated areas and artificial scarps, are located outside the reserve boundaries.

The archaeological features discussed in this conservation plan are protected under the provisions of the Historic Places Act (1993). It is unlawful to modify, damage or destroy any archaeological sites without prior authority from the NZ Historic Places Trust. The offence provisions of the Reserves Act 1977 are also applicable because this is a reserve in terms of that Act.

There are a number of large, complex earthwork structures present in the northern regions of New Zealand. Outstanding examples include Pouerua in Northland, Maungakiekie (One Tree Hill) in Auckland and the Papamoa pa in the Bay of Plenty. Otatara is comparable with these sites in terms of its size, complexity and cultural significance.

During the period 19–21 February 2002 Lynda Bowers and Derek Gosling conducted a condition inspection and vegetation assessment of the Otatara Pa Historic Reserve. Grazing of livestock to control vegetation within the reserve was identified as the activity that currently has the greatest potential to damage the archaeological features.

The general standard of reserve management, in recent years, is high. Considerable thought has already been given to grazing management, site interpretation, weed control and plantings. This conservation plan provides a prescription for a specific and controlled programme of remedial work and regular maintenance which is required in order to stabilise archaeological features in the reserve and ensure that the historic reserve is managed and conserved in a manner consistent with the principles of the ICOMOS New Zealand Charter.

1.3 MANAGEMENT STATUS

Otatara Pa Historic Reserve is currently managed by the Department of Conservation, East Coast-Hawkes Bay Conservancy. The Hawkes Bay Area Office is responsible for managing remedial work and regular maintenance. The reserve has the following statutory management status:

- Historic Reserve (Reserves Act 1977) (1973:1833) (1979:316, 1979:1714, 1979:2035)
- Conservancy Conservation Management Strategy listing (Conservation Act 1987)
- Registered Historic Place, No. 6418 (Category II) (Historic Places Act 1993)

- Recorded Archaeological Site (Historic Places Act 1993)
- Napier City Council: Designated site in Western Hills sub district of City of Napier District Plan: J2/02. Historic reserves (Otatara Pa) Minister of Conservation (Resource Management Act 1991).

The archaeological features discussed in this conservation plan are "archaeological sites" as defined by the Historic Places Act (1993). These archaeological features are protected under the provisions of sections 10-20 of the Historic Places Act (1993). It is unlawful to modify, damage or destroy any archaeological sites without prior authority from the NZ Historic Places Trust. The offence provisions of the Reserves Act (1977) are also applicable because this area is a reserve in terms of that Act.

Otatara Pa Historic Reserve is scheduled in the Conservancy Register of Actively Managed Historic Places. "Actively managed" status means eligibility for the specific allocation of funding for historic conservation work and the provision of visitor services. The Conservancy maintains the register, and a copy of the register entry for the reserve is appended. It contains an official summary of the management intentions.

1.4 KAITIAKITANGA – TANGATA WHENUA AND RESERVE MANAGEMENT

Otatara Pa Historic Reserve is a place of cultural significance to Ngati Kahungunu, and in particular to Ngati Paarau of Waiohiki, who are kaitiaki for Otatara. A fundamental element in the preparation of a conservation plan is the role of tangata whenua in this planning process. Ideally, land managers and tangata whenua should reach agreement and have a formal understanding or management partnership prior to the preparation of a conservation plan.

Ngati Paarau has a vision for Otatara, including aspirations and an expectation of continuing cultural use. They have re-established their cultural links with this place and have been actively involved in the recent development and management of the reserve. The tangata whenua must have an integral role in all aspects of reserve management.

1.5 ASSESSING HISTORIC VALUES

The New Zealand Historic Places Trust (the Trust) has a statutory role under its 1993 Act to identify places of heritage value, and this makes it the New Zealand authority in this matter. The Department of Conservation generally adopts the Trust system and consults with the Trust when required. The current Trust assessment criteria are presented in their registration proposal form. These criteria are:

Historical, cultural, aesthetic, archaeological, architectural, scientific, social, spiritual, technological and traditional significance or value.

These criteria were applied in the assessment of heritage significance undertaken for Otatara Pa Historic Reserve by Elizabeth Pishief in 1997.

1.6 DEVELOPING THIS PLAN

Archaeological Services (Bay of Plenty) was commissioned by East Coast-Hawkes Bay Conservancy to prepare this conservation plan. The conservation plan was developed in consultation with East Coast-Hawkes Bay Conservancy Office and Hawkes Bay Area Office staff, NZ Historic Places Trust staff, Eastern Institute of Technology (EIT) (Warren Hales), Hawkes Bay Regional Council (Simon Stokes), AgResearch (Allan Gillingham), the Hawkes Bay filekeeper for the NZ Archaeological Association and representatives of Ngati Paarau. Consultation with all relevant parties will continue as this plan is implemented.

1.7 CHANGES TO THIS PLAN

Any management proposals, not currently within the scope of this plan, require a change to the plan before the proposals proceed. Changes in management or standards should be discussed and agreed, in writing, by the Department of Conservation and tangata whenua.

2.0 Heritage description

2.1 HISTORY

The history of Otatara Pa Historic Reserve has been detailed in Pishief (1997). The information in this section is quoted from that document.

> *"It is impossible to determine the actual course of events at Otatara, but the significance of those events is not destroyed by this difficulty. The crucial event is that Taraia arrived in Heretaunga and Otatara is the place which commemorates that arrival. The stories relate how everyone is linked to Otatara – through occupation, conquest, marriage and mana – and the Whakapapa binds them all together…The stories reveal the different perspectives of all the groups associated with Otatara and the importance of Otatara to all the people of Heretaunga…It is a monument to all the people of Heretaunga, both the original inhabitants and the newcomers".* (Pishief, 1997:39).

The area now included within the Otatara Pa Historic Reserve came into European ownership in 1851 when Donald McLean purchased the Ahuriri Block on behalf of the Crown. The Crown granted the main part of the reserve to James Anderson in 1861. The area of the reserve formed part of Redcliffe Station that was owned and farmed by the Dolbel family from about 1865 until 1971. The Crown, Napier City Council and the Hawkes Bay County Council purchased an area of 27.6 hectares in 1971 for the purpose of an historic reserve (Pishief, 1997:42). Additional areas of land owned by the local councils were added to the reserve in 1975. Two further areas were added in 1979. The current reserve area totals 33 hectares (Conservation Management Plan, 2001:10). In 2001 the Department of Conservation, on behalf of the Crown, entered an agreement to purchase adjoining land that will be added to the historic reserve.

2.2 PHYSICAL FEATURES

A full description of archaeological features has been prepared by Kevin Jones, Science and Research, Head Office, Department of Conservation, Wellington, and published in Pishief (1997) *Assessment of Heritage Significance - Otatara Pa Historic Reserve.* This is attached as Appendix 2. The following summary is derived from that description.

2.2.1 Archaeological features

Otatara Pa Historic Reserve contains a portion of an extensive cultural landscape that covers approximately 44 hectares. This landscape has a large number of visible surface archaeological features. In the area of the reserve these archaeological features include two pa – Otatara and Hikurangi, and associated pits and terraces.

Otatara Pa was substantially destroyed by quarrying activities between *c.*1925 and 1986. A

remnant portion of this site survives at its eastern end. Kevin Jones has provided a description of the site based on 1949 aerial photography.

Hikurangi Pa is an extensive site consisting of three large ridge platforms. These platforms are spaced along a central ridgeline, with terraced ridges and faces to the west, south and southeast.

Many of the pits at Otatara are large, well defined and rectangular. The majority probably had pronounced raised rims, but in most cases these have been eroded.

Significant archaeological features including pits, terraces, cultivated areas and artificial scarps, are located outside the reserve boundaries. Most of these features are on private land to the west and southwest of the reserve. These features are contiguous with those in the reserve and form an integral part of the settlement complex.

2.2.2 Physical setting

Otatara Pa Historic Reserve (grid reference NZMS260 V21 390 769) lies within the Heretaunga Ecological District of the Hawkes Bay Ecological Region (McEwen, 1987). The topography of the reserve ranges from moderately steep hills to strongly rolling hills with short slopes (Land Resource Inventory Worksheet 134 - 1974). The surface geology consists of a mantle of loess (wind blown silts with some ash content) overlaying sandstones and siltstones, interbedded with limestones and conglomerates (Kingma, 1971, quoted in Land Resource Inventory Worksheet 134 - 1974). Soils are yellow-grey earths.

The climate of the district is characterised by warm summer temperatures and mild winters. The rainfall is low (800-1200 mm) with high annual and monthly variability. Periods of drought are common, especially during the summer-autumn period. Soil slip, sheet and gully erosion occur on the steeper slopes (S Stokes, pers. comm.).

2.3 PHYSICAL MODIFICATIONS

There is a comprehensive discussion of the physical modifications that have occurred at Otatara in Pishief (1997, section 2.6; pp.66-74). The information is summarised in this conservation plan.

There have been modifications to the physical evidence of human occupation and use at Otatara. Modifications have occurred as a result of natural and human processes and the successive phases of occupation have, no doubt, resulted in the partial loss of physical features from earlier phases of occupation. Processes and actions, which have resulted in the physical modification of features at Otatara, include:

- Modification, destruction or loss of features due to overbuilding or landscape modification in subsequent occupation phases,
- Quarrying,
- Farm road formation and water supply installation,

- Fencing,
- Livestock grazing and trampling,
- Vegetation growth and tree root action,
- Track formation,
- Archaeological investigation,
- Erosion and water action,
- Reserve enhancement for interpretation purposes.

There have been a series of archaeological investigations at Otatara, from the time of Augustus Hamilton's photography of Otatara in the 1890s. The investigations have included; photography, plan drawings, written description, radiocarbon dating sample collection, artefact collection and excavation.

The process of archaeological excavation is invasive and obviously destructive of physical evidence, although only small areas are usually disturbed. Archaeological excavation results in the preservation of information held within features through a process of retrieval, analysis and interpretation. Limited archaeological excavation was carried out at Otatara in association with the reserve enhancement work during the early 1990s. Further detail of the archaeological investigations at Otatara is available in Pishief (1997, section 2.2.4; pp. 46-53).

In 1990 a pilot Conservation Corps project started reserve enhancement works at Otatara Pa Historic Reserve. These works were aimed at improving the protection and management of the archaeological features at Otatara, as well as asserting the role of tangata whenua in the management of reserve. One aspect of this project was the construction of 3.5+ metre high palisades on the quarried portion of Otatara Pa as an interpretation of a defensive structure. Roof structures for pits and whare were also built from kanuka. Several large pou were erected at the southern and northern ends of the reserve.

These structures have become a feature of the reserve. The palisades and pou represent continuity of cultural use of the site. As such, it is appropriate that they be included within the conservation plan. A structural engineering report has been prepared to guide remedial work and maintenance required on the palisades and is included as Appendix 4. The repair of the palisades will necessitate ground disturbance and will require an authority from the NZ Historic Places Trust.

Avoiding unwarranted and undesirable modification of archaeological features within the reserve is the major objective of the conservation plan. Effort must be concentrated on the stabilisation of features wherever practicable and the avoidance of management actions which may result in the loss of archaeological information.

2.4 CHRONOLOGY

Elizabeth Pishief has presented a discussion of the traditional history of Otatara (Pishief, 1997: pp9-39). She also discussed the reasons why it is inappropriate, and inaccurate, to present oral histories as a chronology.

A chronology is useful, however, to briefly summarise the history of management of Otatara since it came into European ownership.

1851	Ahuriri block (including Otatara) purchased by McLean on behalf of the Crown
1861	Block 55, Puketapu Crown Grant District (including Otatara) granted by the Crown to James Anderson
1865	Philip Dolbel purchased 900 acres (including Otatara) to form part of his Springfield estate. Otatara became part of Redcliffe Station
1890s	Augustus Hamilton photographed Otatara and drew profiles of Otatara Pa proper (site later destroyed by quarrying)
1908	Redcliffe Station passed to Philip Dolbel's nephew. Ownership remained in the Dolbel family until 1971
c 1925-1936	Quarrying of Otatara Pa proper commenced
c 1949-1960	Main farm track formed through Otatara and fencing installed
1971	An area of 27.6 hectares, which included most of the undamaged earthworks, and access to Springfield Road, was purchased by the Crown, Napier City Council and Hawkes Bay County Council for the purpose of an historic reserve
1973	The Otatara Pa Historic Reserve Board was established to control the reserve. Quarry area transferred to Ray Withers Contractors Ltd
1975	Reserve Management Plan prepared. Reserve in one paddock with one stock dam
1977	Development Plan prepared for quarry area
1979	Quarry transferred to Crown for historic reserve, but with agreement to allow quarrying to continue
1981	The Reserve Board appointment was revoked and the Department of Lands and Survey took over management of the reserve
1980s	Bulldozed road, water pipes and trough system installed by Otatara Trust Inc. (reserve grazier at the time). Work done without Department of Lands & Survey consent

1986	Quarrying of Otatara Pa proper ceased. The Waiohiki Marae Committee applied for responsibility and control of the old quarry site. Beginning of involve ment of Waiohiki Marae in management of the reserve
1987	Department of Conservation took over management of the reserve
1989	Otatara Conservation Corp – run by Waiohiki Marae Committee – began enhancement work on former quarry site. Planting and reconstruction of palisades
1990	Archaeological investigation of two pits on Otatara Pa proper
1991	Installation of loop walking track, fencing, interpretation boards and markers
1997	Archaeological excavation of midden on Otatara Pa proper as part of work to stabilise an eroding bank. Ridge tops and main platforms of Hikurangi Pa fenced and retired from grazing. Assessment of heritage significance pre pared
2001	Conservation Management Plan prepared
2002	Geometria commissioned to complete 3 dimensional map condition report and monitory recommendations for site
2002	Conservation plan prepared

3.0 Information

3.1 OLD PLANS

Refer to Pishief (1997, section 6.1; pp 82-90).

3.2 MEASURED DRAWINGS

Refer to Pishief (1997, section 6.1; pp 82-90). A topographical plan was prepared in 1999 by Vanessa Tanner, based on an earlier plan by Bruce McFadgen. This plan was prepared by interpretation of aerial photography. The plan is held by East Coast-Hawkes Bay Conservancy of Department of Conservation. In 2002 the Department of Conservation commissioned Geometria to complete a full 3 dimensional plan for Otatara Historic Reserve and the adjoining parcels of land under negotiation for purchase. This plan will provide a level of detail required for monitory and management practises.

3.3 OLD PHOTOGRAPHS

Refer to Pishief (1997, section 6.2, pp 90-91).

3.4 RECENT PHOTOGRAPHIC RECORD

Refer to Pishief (1997, section 6.3, pp 91-92). Bowers & Gosling also took photographs during the site inspection in February 2002. These photographs are held by the Department of Conservation, East Coast-Hawkes Bay Conservancy. Adrienne Martyn completed a photographic essay featuring the palisades on Otatara Pa in approximately 1999. These photographs are held on file at the Hawkes Bay Area Office of the Department of Conservation.

3.5 WRITTEN ARCHIVES

Refer to Pishief (1997, section 6.4; pp 92-96). Elizabeth Pishief assembled an extensive photocopy archive during her 1997 research. This information is held on file in the Hawkes Bay Area Office, Department of Conservation.

3.6 ORAL SOURCES

Pishief consulted with the tangata whenua of Otatara. Tipu Tareha assisted with the recording of oral history from kaumatua and other knowledgeable people (Pishief, 1997:8). The traditional history of Otatara is recounted in Pishief (1997, pp 9-39).

3.7 OTHER SOURCES

Pishief (1997) provides a list of known sources of information. A bibliography containing sources consulted during the preparation of the conservation plan is included within this document.

Portable artefacts that contribute to the heritage value of Otatara Pa Historic Reserve are regarded as an important source of information. There are items held in the Hawkes Bay Museum collection, provenanced to Otatara (Pishief, 1997:96).

4.0 Significance

An *Assessment of Heritage Significance for Otatara Pa Historic Reserve* was prepared in 1997 by Elizabeth Pishief. The following statement of significance is based on the information contained in that assessment.

4.1 HISTORICAL SIGNIFICANCE

Otatara Pa Historic Reserve, and the greater Otatara complex, has considerable historical significance. It is associated with key historical events and individuals and is an integral part of the traditional oral histories of Heretaunga. All the hapu of Heretaunga have connections to Otatara within their whakapapa. Otatara also links to the whakapapa of a number of other Iwi – for example, Ngati Awa and Ngai Tahu.

4.2 ARCHAEOLOGICAL SIGNIFICANCE

The archaeological and scientific significance of Otatara lies in its potential to contribute information which would further the scientific understanding of the history of human occupation. Otatara also has significance are a physical monument of past human habitation. Otatara, as a very large open settlement complex, also containing evidence of fortification, has the potential to provide archaeological information relating to the history of the Heretaunga area. It also has national archaeological significance for its potential to contribute to greater understanding of the form and function of large earthwork structures.

There are a number of large, complex earthwork structures present in the northern regions of New Zealand. Outstanding examples include Pouerua in Northland, Maungakiekie (One Tree Hill) in Auckland and the Papamoa pa in the Bay of Plenty. Otatara is comparable with these sites in terms of its size, complexity and cultural significance.

There has been very little systematic archaeological investigation of Otatara. It is likely that the majority of the remaining archaeological features are intact and have not suffered major stratigraphic disruption.

Although the loss of the majority of Otatara Pa proper due to quarrying has removed an essential element of the overall settlement complex, the vastness of the archaeological landscape and the integrity of the surviving features ensures that Otatara retains its archaeological significance.

4.3 CULTURAL SIGNIFICANCE

Otatara has cultural, traditional, spiritual and social values closely associated with Ngati Kahungunu, and in particular Ngati Paarau of Waiohiki Marae. The reserve should be conserved and managed in a manner consistent with the protection of these values.

Otatara is tapu to the people of Waiohiki – it is an urupa and a wahi tapu. It is an important place and they want people to know that it is their pa and that they protect it…they have undertaken work on the site to reclaim the mana whenua of the pa and enhance the mana of the site that has been affected by quarrying (Pishief, 1997:75).

5.0 CONDITION REPORT

During the period 19–21 February 2002 Lynda Bowers and Derek Gosling conducted a condition inspection and vegetation assessment of the Otatara Pa Historic Reserve.

Condition reporting for large earthwork structures that are principally archaeological sites is a recently developed technique. The technique developed through work undertaken by Jones and Simpson in the early 1990s (Jones & Simpson, 1995), and has been used for conservation plans prepared for the Department of Conservation. It has been found that a systematic condition survey identifies the factors causing deterioration of the archaeological site and leads directly to actions required to achieve stabilisation of the site features. Condition reporting documents rates of change and indicates appropriate methods to stabilise the site where detrimental changes are occurring.

METHODS

It became apparent that a detailed survey method (such as that employed at Te Koru Pa Historic Reserve) was beyond the scope of the February 2002 inspection. This is discussed in section 8.7.
For the purposes of the field inspection, it was necessary to make some general extrapolations of condition from the comments on an aerial photograph produced in 1997 (Pishief 1997, figure 8; p.57). Pishief's commentary on the management history of the reserve was also used to provide some general guidance on previous site condition.

In addition to the field inspection, Bowers and Gosling consulted with people involved in the management of Otatara. The results of these discussions have been incorporated into the conservation plan.

Condition notes – February 2002

Archaeological features

The archaeological field inspection was carried out following a year of unusual weather conditions. There had been atypical grass growth due to those conditions. Grass within the reserve, particularly on the ridges, was dense and rank. The higher than average rainfall, and the general absence of characteristic drying winds during the summer, meant that the site had retained a thick sward of grass. This made a close inspection and assessment of individual archaeological features difficult. It became apparent that condition surveys at Otatara should be carried out in summer and winter conditions.

The overall impression gained during the February 2002 inspection is that the site condition has become considerably more stable since 1997. This stabilisation can be attributed to the improved management of livestock grazing in the reserve during this period. The benefits of the recent fencing programme are apparent as this has allowed stock to be more intensively managed as well as excluding them from sensitive areas. There was no evidence of any recent livestock tracking along fence lines. Appropriate management of the graz-

ing regime within the reserve is central to the protection of the archaeological features.

The on-going weed control programme is beginning to reduce the problems identified previously on Otatara Pa proper, but this programme will need to be maintained (Plate 1). Erosion is still occurring on this portion of the site, and the ground cover is sparse.

Plate 1: Otatara Pa proper, showing interpretive pallisades and erosion from quarry road.

The damage caused by stock camping, noted in 1997 on the southwest ridge, is still evident. Livestock have been excluded from this area and it is lightly grazed on an occasional basis. As stock camping has ceased there has been no further deterioration of this area, and a grass sward has been established.

In February 2002 the main platforms and ridges of Hikurangi Pa had not been grazed since October 2001. The pasture sward was dense and well established (Plate 2). No recent damage to archaeological features was evident in these areas.

Severe stock tracking and camping was noted on the south east ridge in 1997. This damage is still apparent, however no new damage appears to be occurring (Plate 3). The pasture sward on the slopes is less dense than on the ridges, and these areas are vulnerable to livestock tracking. Damage occurs quickly once the pasture sward is broken, and areas of exposed earth caused by erosion or stock tracking are very slow to regain any vegetation cover (Plate 4).

Plate 2: North-west platform, Hikurangi Pa, showing rank pasture.

Plate 3: South-east ridge of Hikurangi Pa, showing previous stock damage.

Plate 4: View of lower south-east ridge showing areas of exposed earth caused by erosion and stock tracking.

Weeds, rather than a grass sward, cover several pits in the vicinity of the south ridge and lower southeast ridge. Bare earth was exposed at the rims of some pits. This suggests that the pits are likely to have had little vegetation cover during the previous winter. The accumulation of sheep droppings in and around the majority of pits suggests that animals shelter in them.

Kanuka treeland is established in east valley (south). In a few areas this treeland is beginning to encroach on archaeological features. There are also isolated individual kanuka trees becoming established on the southern portions of Hikurangi Pa.

Informal tracks used by visitors to the reserve are still evident, however the impact of these tracks appears to be reducing. Most visitors observed during the condition assessment were using the loop track.

Vegetation history

Prior to human settlement, podocarp/broadleaf forest would have covered the lowland hills of the Heretaunga Ecological District and it is likely that this forest type would have been the original vegetation cover of the Otatara Pa Historic Reserve (G Walls, pers comm.). Following human settlement, the Maori population of the district would have exerted considerable influence on the vegetation cover and by 1840 much of the forest cover on the lowland hills would have been replaced by bracken (*Pteridium esculentum*), secondary scrub and shrublands (Grant, 1996).

During the period of Maori occupation Walls considers that Otatara was likely to have been covered by native grasses and tussocks, but when the site was abandoned it probably quickly reverted to a cover of bracken (*Pteridium esculentum*), manuka (*Leptospermum scoparium*), and kanuka (*Kunzea ericoides*). Broadleaved trees, conifers, whauwhaupaku (fivefinger; *Pseudopanax arboreus*) and coprosma shrublands may also have established, using the bracken and manuka as nursery cover (G Walls, pers comm.).

When Otatara passed into European ownership in 1861 the existing vegetation was converted to pasture and grazed by livestock, presumably sheep and cattle. Today, grassland still covers most of the reserve. Small areas of kanuka treeland have established in the eastern gullies. Ngaio (*Myoporum laetum*) and tree lucerne (*Chamaecytisus palmensis*) have been planted in the head of a gully below west ridge. A gully and section of hill slope above the entrance car park has been revegetated with tree lucerne and indigenous plants. The former quarry adjacent to Springfield Road has been partially planted and is now a mosaic of indigenous shrubs and trees, interspersed with tree lucerne, brush wattle (*Paraserianthes lophantha*), blackberry (*Rubus* sp.; *R fruticosus* agg.) and other weed species.

Vegetation assessment

The reserve vegetation was mapped (Figure 2) and described (Appendix 5), and a species list compiled (Appendix 6), during the February 2002 site inspection.

Result

Grazing of livestock to control vegetation within the reserve was identified as the activity that currently has the greatest potential to damage the archaeological features.

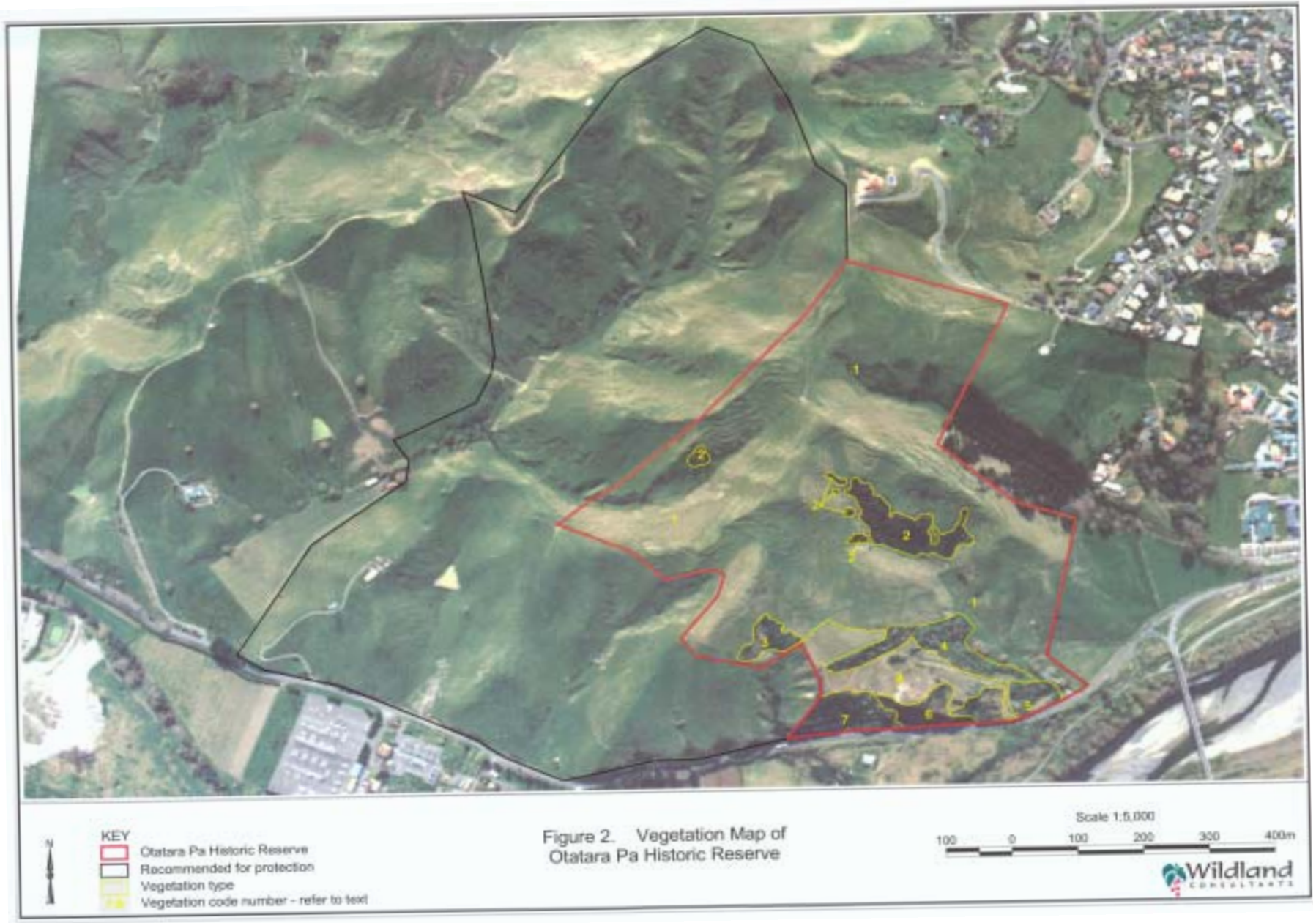

Figure 2. Vegetation Map of Otatara Pa Historic Reserve

6.0 Threats

Threats to archaeological features within the Otatara Pa Historic Reserve come principally from; natural processes, human activities, livestock grazing, information loss and loss of reserve integrity and setting.

6.1 NATURAL PROCESSES

Threats to archaeological features within the Otatara Pa Historic Reserve from natural processes include fire, erosion and vegetation. Inevitably these processes interact and cannot be considered in isolation.

6.1.1 Fire

The annual rainfall in the Heretaunga Ecological District is low, but perhaps the most important feature of the climate is its extreme variability - frequent dry spells and droughts often precede rains of very high intensity (Seelye, 1940). These weather patterns, coupled with the light flammable grasses, create frequent periods of extreme fire risk within the reserve.

Whilst a fire may not affect the archaeological features, subsequent rainfall would expose those features to damage by erosion. Alternatively, strong winds and continuing fine weather following a fire is likely to lead to wind erosion. Machinery or fire fighting tactics used in rural fire suppression, e.g. earthmoving machinery and fire line construction, can also damage archaeological features.

6.1.2 Erosion

The distribution of rainfall within the district is characterised by frequent lengthy droughts and also high intensity rainstorms. In hill country this combination of factors leads to serious erosion. Rainfall is more variable here than in any other part of the North Island (Land Resource Inventory Worksheet 134 – 1974).

The erosion potential within the reserve is for slight soil slip, sheet and gully erosion (S Stokes, pers. comm.). To date, most erosion appears to have been associated with tracking and stock damage, although there is obvious potential for high intensity rainfall to accelerate erosion in places where management activities have created areas of exposed soil.

6.1.3 Vegetation

Vegetation, particularly large trees, can damage both surface and sub-surface archaeological features destroying information about the site (Bowers, 1998). The low, dense grassland that covers most of Otatara Pa Historic Reserve provides ideal protection for the surface and sub-surface archaeological features. If this grassland can be maintained, detrimental impacts from vegetation can be minimised. Threats to the current vegetation cover include loss of that vegetation by fire, erosion, over-grazing or vegetation changes due to successional processes or weed invasion.

6.2 HUMAN ACTIVITIES

Human impacts on archaeological features within the reserve can be grouped as follows; visitor impacts, machinery use and management impacts.

6.2.1 Visitor impacts

Visitor activities have the potential to damage the archaeological features of Otatara Pa Historic Reserve. The reserve is popular as a recreational area, particularly with people from the Taradale area, and it is estimated that there are up to 7000 visitors to the reserve per annum (Conservation Management Plan, 2001). This level of visiting ranks Otatara as the ninth most visited reserve administered by the Department Conservation in Hawkes Bay (P. Sheridan, pers. comm.).

The increasing intensification of housing adjacent to the reserve may lead to higher visitor numbers and an increased risk of inappropriate activities within the reserve. Visitor damage can be caused by mountain bikes, motorbikes, horse riding, informal tracking, vandalism, excavation and activities that concentrate large groups of people at specific points, e.g. open air concerts, school visits.

6.2.2 Machinery use

Machinery used in association with livestock management, fire control, the establishment of tracks or the placement of interpretation panels and track markers may damage archaeological features within the reserve.

6.2.3 Management impacts

The establishment of tracks, the placement of interpretation panels, track markers, the construction of fence lines and stiles, the placement of troughs for stock water and cultural use by tangata whenua may all inadvertently damage surface or sub-surface archaeological features within the reserve.

6.3 GRAZING

Grazing of livestock, to maintain a protective grass cover on archaeological features, has the potential to seriously damage archaeological features through trampling and tracking.

Grazing at Otatara is currently being used as a tool to maintain the reserve in a vegetation cover that offers the best protection to archaeological features while also providing for public viewing and appreciation of the surface features. The risk to archaeological features posed by livestock grazing must be carefully balanced against the risk to archaeological features caused by a change in the existing vegetation cover.

Grazing creates a favourable habitat for rabbits. Rabbits may damage archaeological features by burrowing.

6.4 INFORMATION LOSS

The loss of archival information such as documents and photographs or unrecorded oral history constitutes a threat. This material provides a link with the past and is an integral component of the history of the site.

6.5 LOSS OF RESERVE INTEGRITY

Changes in landuse adjacent to the reserve threaten its integrity and setting. The change from rural pastoral landuse to more intensive activities or residential housing may cause loss of, or damage to, archaeological features that are outside the current reserve boundary, but which form part of the Otatara cultural landscape. There is also a threat to the visual integrity of the site through the loss of its rural setting.

7.0 THREATS MANAGEMENT

The previous section identified a range of potential threats to the archaeological features within Otatara Pa Historic Reserve. Reserve management practices have already been developed that address some of these threats. These practices are discussed below and additional, or alternative, mitigation measures are proposed.

7.1 NATURAL PROCESSES

7.1.1 Fire

Vegetation fire risk is influenced by a combination of climate, topography, vegetation and ignition sources. The primary fire management objective for rural fire authorities is to minimise risk of fire while retaining sufficient resources to rapidly extinguish any outbreak of fire that does occur.

The risk of an outbreak of fire at Otatara can be minimised by accurately assessing the daily fire risk and then reducing ignition sources during periods of high fire danger (e.g. limiting public access, publicity about the risk, restricting management activities etc.).

Reducing the fuel loadings of vegetation can significantly reduce the intensity of a fire, thus making it easier to control and reducing the risk of it spreading to neighbouring properties. Reduction of fuel loadings at Otatara can best be achieved by maintaining a short pasture sward.

Pre-planning of fire control can help reduce the risk of damage to archaeological features during fire fighting operations through the development of tactics that reduce or eliminate the need to use earthmoving machinery or to construct fire lines through archaeological features. Specialist Departmental fire control staff could assist with this pre-planning. Other conservancies within the Department of Conservation have experience in managing this issue. In particular, Wanganui Conservancy may be able to provide useful information and advice.

7.1.2 Erosion

The judicious management of vegetation, fire, grazing and visitors should limit erosion potential. Relevant management practices are discussed under their topic heading.

7.1.3 Vegetation

Grazing is required to maintain the low pasture sward covering the archaeological features of Otatara Pa Historic Reserve. The sheer size of the site, coupled with a desire to maintain clear definition of surface features for interpretation purposes, eliminates other vegetation management options.

Under the present grazing and fertilizer regime the current pasture sward should remain relatively stable (with some seasonal variation of species composition), over the next few years. It is considered by many graziers, however, that pasture swards on hill country in Hawkes Bay cannot be maintained over a longer term without cattle (W Hales (EIT), pers comm.; S Stokes (Hawkes Bay Regional Council), pers comm.). This suggests that the reserve may need to be grazed by cattle to maintain the present vegetation cover in the long term. Consequently, alternatives to the existing grazing regime at Otatara should be investigated.

Consideration has been given to the option of ceasing all grazing in the reserve in order to eliminate the risk to archaeological features posed by livestock trampling and tracking (P Bain, pers comm.). If grazing were discontinued at Otatara, it is likely that the pasture would become rank and would thin out over time, providing openings for invasive weeds and indigenous successional species. Even with an aggressive weed control programme, without grazing, the reserve is likely to quickly revert to gorse (*Ulex europaeus*), broom (*Cytisus scoparius*), blackberry (*Rubus* sp.; *R. fruticosa* agg.), and bracken (*Pteridium esculentum*), interspersed with rank pasture and herbaceous weeds. Potato vine (*Solanum jasminoides*) is likely to spread rapidly and dominate in places. The kanuka (*Kunzea ericoides*) and manuka (*Leptospermum scoparium*), at present confined to the eastern gullies and hill slopes, will begin to establish throughout the site.

Provided a suitable grazing regime can be established, and weed control continues, it is unlikely that the site vegetation will markedly alter over the next decade. The kanuka tree land, left unchecked, is likely to continue to spread onto the eastern faces and ridges (Plate 5). It should be removed where it is encroaching on to archaeological features. Gorse, blackberry and potato vine will require ongoing control and it would be advisable to control the smilex (*Asparagus asparagoides*) and tradescantia (*Tradescantia fluminensis*) infestations before they displace pasture and become unmanageable.

Plate 5: Kanuka treeland on slopes of south-east ridge.

7.2 HUMAN ACTIVITIES

7.2.1 Visitor Impacts

A visitor management programme should be developed for Otatara. Visitor numbers are already high and are likely to increase with the spread of housing adjacent to the reserve, and local population growth.

Monitoring and visitor surveys could be undertaken (in conjunction with EIT tourism students and/or tangata whenua) to determine visitor activities, seasonal patterns of use and more precise visitor levels. It would also be useful to examine why people are visiting the reserve – is it for the outdoor experience, views obtained from the site, archaeological features or perhaps a combination of these experiences? Such surveys could help guide future reserve management and interpretation.

Policies need to be developed to exclude mountain bikes, motorbikes and horse access to the reserve. These policies should be advertised and enforced. Signs outlining restrictions should be maintained at entrance points to the reserve.

Tracks should be clearly defined, well maintained, and signposted to ensure that informal tracking does not increase. Tangata whenua should be encouraged and supported in providing guided walks for large groups. This would enhance the visitor experience and minimise the risk of accidental damage to archaeological features. A programme of guided walks would also provide a valuable learning experience for visiting groups. This opportunity is further discussed in section 8.10.

The future of open air concerts or similar activities should be discussed with tangata whenua so that public health and safety issues can be addressed and provision made for the protection of archaeological features.

7.2.2 Machinery Use

No earth moving machinery, or machinery likely to cause ground disturbance during normal operation, should be used in the reserve without prior consultation with the NZ Historic Places Trust.

7.2.3 Management Impacts

Archaeological advice should be sought, prior to any management activities undertaken in the reserve, to ensure that archaeological features are not at risk.

7.3 GRAZING

Damage to archaeological features can be avoided if livestock are carefully managed and closely monitored. Factors that must be considered when grazing livestock on archaeological features include:

- The age, species and number of animals,
- seasonal influences,

- the duration and timing of grazing,
- fence, gate and water trough placement,
- animal behaviour (congregation of stock, trampling, tracking),
- length of grazing rotation,
- animal welfare and husbandry.

Consideration must also be given to the practicalities of livestock management. Even rent-free grazing is undesirable, from a grazier's perspective, if livestock condition cannot be maintained or improved. Animal husbandry and welfare are important issues for both the lessor and the grazier. In most cases the grazier needs to be able to plan ahead, with a reasonable degree of certainty, to prepare animals for markets. If animals need to be moved on or off a site irregularly, and at short notice, the usefulness of the grazing opportunity obviously diminishes.

A degree of ground damage due to stock trampling and tracking is going to occur as a consequence of using animals to maintain the pasture sward. This risk should be managed, so that damage occurs in areas where archaeological features are not affected. Close liaison with the grazier is essential if damage to archaeological features is to be avoided.

Animals could be given several areas for camping, and moved regularly, so that the amount of stock trampling and tracking that occurs in any one area is light. Artificial ground hardening, using shingle or cement, could be considered in areas where congregation of stock occurs – for example, gateways and around water troughs.

The short pasture sward creates a favourable habitat for rabbits. When grass is dense and rank the rabbit population tends to decrease. Rabbit numbers in the reserve should be monitored by observation and, if population increase is observed, control operations should be undertaken.

In 1997 an attempt was made to improve the pasture within the reserve in order to minimise stock damage to archaeological features. Three ridge tops were fenced to exclude stock and over sown with various pasture species (Eastwood, 1997). The over sowing treatments were not successful due to a number of factors, including removal of the seed by birds and insects and the lateness of the over sowing (which had to be delayed because of a summer drought). The general pasture condition on the ridges, however, improved markedly where the stock had been excluded (Gillingham, 1999). These areas are now only stocked for a short period from April to November on a two day rotation basis to reduce pasture deterioration. The extension of this programme, to include the remaining unfenced ridges should be considered.

It is essential that the grazier has a clear understanding of the role of grazing in the management of the reserve, but equally, the department must recognise the grazier's need to maintain or improve the condition of stock, and the grazier's responsibility for animal health and welfare. It is also important that the grazing is well managed to ensure that damage to archaeological features is avoided.

The Eastern Institute of Technology - Agricultural Section currently manages the grazing of the reserve. The Institute are ideal graziers for the reserve due to the following reasons:

- EIT is located immediately adjacent to the reserve and this allows grazing to be closely managed and monitored,
- EIT has land immediately adjacent to the reserve and this will allow stock to be quickly moved off the reserve if required,

- EIT is a training institute, and as such their focus is on teaching sound land management and farming practices,

- As a teaching institute, EIT has a commitment to maintaining high standards of management practice and keeping abreast of research findings, thus making them receptive to the development of alternative grazing regimes.

7.4 INFORMATION LOSS

The establishment of a document bank could effectively combat the loss of information associated with the history and management of Otatara Pa Historic Reserve. This document bank would be the repository for all written information accumulated during any management action within the reserve. The documents assembled by Elizabeth Pishief in 1997 during the course of her research for the assessment of heritage significance form the basis for such a collection. These documents are currently stored in the Department of Conservation's Hawkes Bay Area Office.

7.5 LOSS OF RESERVE INTEGRITY

Methods to address threats to the integrity of the reserve setting and use are discussed in section 8.8.

8.0 Reserve Management

The following management standards should be applied at Otatara Pa Historic Reserve in order to ensure the on-going protection, conservation, and appreciation of this cultural landscape.

8.1 STANDARDS OF CONSERVATION

The international organisation, which develops cultural heritage conservation policies, is ICOMOS, the International Council on Monuments and Sites. All conservation work at Otatara Pa Historic Reserve should be guided by a plan consistent with the principles of the ICOMOS New Zealand Charter (1993).

8.2 LEGAL REQUIREMENTS

All reserve management and conservation work carried out at Otatara Pa Historic Reserve must comply with the requirements of the Historic Places Act (1993). The archaeological features in the reserve are protected under the provisions of sections 10-20 of the Historic Places Act (1993). It is unlawful to modify, damage or destroy any archaeological sites without prior authority from the NZ Historic Places Trust.

Management must also be consistent with the requirements of the Conservation Act (1987) and the Reserves Act (1977).

The Department of Conservation should pursue having the Historic Places Trust registration category for Otatara Pa upgraded from its existing Category II status to Category I. The department should also advocate the registration of archaeological features that are currently in private ownership, adjacent to the reserve.

8.3 SPECIALIST ADVICE

Planning for conservation work should be based on adequate and reliable information being first obtained and critically analysed. Specific projects and work within the reserve will require input from people with specialist skills. Skills of particular relevance include; archaeology, agricultural and livestock management, archival research, visitor management, interpretation, structural engineering and plant ecology (including a knowledge of invasive weeds).

8.4 INTERVENTION

All reserve management activities (including grazing)should be undertaken so as to ensure

the minimum possible intervention with the archaeological features, as they presently exist. Increasing levels of intervention are defined by ICOMOS as: maintenance, stabilisation, repair, restoration, reconstruction and adaptation.

Any new elements that are introduced into the reserve, such as new fence posts holes, should be clearly identified to avoid confusion with earlier archaeological features. The use of marker layers, such as fine gravel or geotextile material, would distinguish features such as farm fences.

Any future proposals to install reconstructed material within the reserve should be restricted to the area of the archaeological site that has already been wholly modified or destroyed by quarrying. The introduction of additional material to the reserve should only occur after assessment and approval by the Department of Conservation and tangata whenua.

8.5 APPROVED USE

Otatara Pa is an historic reserve, open for public visits. The approved use under this reserve designation is passive recreation and education visits. Any change to the approved use should be reviewed in the light of changed impacts and financial viability, and may require to be sanctioned by a change to the plan (section 1.7).

8.6 DOCUMENTATION OF WORK

All work, except for minor general maintenance, should be documented through notes and photographs. Documentation of this work should be kept on file at the Hawkes Bay Area Office and the conservancy office. A document bank should be established to hold information relating to the conservation and management of the reserve.

8.7 MAPPING AND CONDITION SURVEY

A topographical plan of the archaeological features within Otatara Pa Historic Reserve was produced in 1999 from interpretation of aerial photography. While this plan is an improvement on previous mapping, it does not provide sufficient detail and accuracy for condition reporting on the scale necessary at Otatara. An exceptionally accurate and detailed level of site mapping and condition survey is desirable for the following reasons:

- The vastness of the site, and large number of visible surface features, requires the application of a very precise and detailed mapping technique in order to accurately record site features and their condition.

- A precise condition survey at Otatara requires a considerable period of fieldwork (in the order of 60–80 hours), and could best be achieved with a project team of archaeologists.

Although several archaeologists have been involved in the management of Otatara Pa Historic Reserve since the early 1970s, there has been no systematic condition report prepared for the reserve. The factors above probably account for the absence of such a condition report.

The Department of Conservation has recently commissioned a detailed map of Otatara. Three-dimensional mapping, which utilises both aerial and ground based mapping techniques, will provide a robust management, monitoring and interpretation tool. The highest possible standard of mapping should be employed at Otatara in order to ensure accuracy for management and monitoring purposes. Mapping will include all the visible archaeological features and not be restricted by the existing boundaries of the historic reserve.

A condition survey will be undertaken in conjunction with mapping. Objective measures of condition should be developed with the result providing a baseline for future monitoring. The condition survey may be restricted to the historic reserve, but ideally should include the whole archaeological complex if landowner consent can be obtained.

8.8 INTEGRITY OF SETTING

The landscape qualities of the reserve setting are integral to the authenticity of Otatara and should be identified and conserved. Together they constitute the heritage setting.

Every effort should be made to maintain:

- Views of the surrounding plains and river,
- Visual link to Waiohiki Marae,
- Views of pit and terrace features on Hikurangi Pa – visible from Otatara Pa,
- Views of pou at the southern and northern boundaries of the reserve,
- Visual contrast between bush in gullies and grassland on ridges,
- Adjacent rural pastoral or low-density landuse.

The land adjoining Otatara Pa Historic Reserve to the west has recently been subdivided for rural residential development (Figure 1). The Department of Conservation (on behalf of the Crown) has reached agreement to purchase a portion of the land that adjoins the existing reserve boundary, for addition to the historic reserve. This adjacent land contains archaeological features that are contiguous with the Otatara cultural landscape.

In addition, there are significant archaeological features located on land that is not included in the current purchase proposal. If this land is not placed in public ownership, or protected by covenant, the archaeological features will be subject to on-going risk.

The creation of a buffer between the historic reserve and encroaching urbanisation is desirable. The intensification of housing development in the vicinity of the reserve poses potential risks to the archaeological features, due to the increasing likelihood of inappropriate activities occurring in the reserve. The loss of reserve integrity, through loss of setting, is also a significant issue for both the Department of Conservation and tangata whenua.

8.9 VISITOR FACILITIES

Visitor facilities should maximise the quality of the visitor experience while avoiding any adverse impacts to archaeological features.

The Springfield Road car park is mown and kept tidy, but there is no 'sense of arrival' and much could be done to improve this facility. Vandalism in the car park is apparently an ongoing problem, although damage lessened when some pruning and tree removal made the car park more visible from the road (P Sheridan, pers. comm.).

Otatara Pa Historic Reserve presents a dramatic cultural landscape on the margins of a large urban population. The archaeological features are well managed and reasonably well interpreted, but the rather unkempt nature of the restoration plantings adjacent to the car park, and Otatara Pa proper, present a disappointing first impression to reserve visitors.

Given the national significance of the archaeological site, a redesigned car park and reserve entrance, incorporating a new toilet block, at Springfield Road are justified. . The recent burning down of the former toilet block reinforces the need to redesign the reserve entrance to ensure the risk of vandalism to structures is minimised. A suitably qualified landscape architect should prepare a carefully designed entrance and car park, which draws in the appropriate design elements of the reserve and the relationship of tangata whenua to the land.

The Churchill Drive entrance has very limited parking and there would appear to be potential for conflict if visitor numbers increase and cars block residents' access to their driveways. It may be prudent to visit property owners adjacent to the Churchill Drive access to determine if such a problem is of concern. Alternatively, use of this entrance could be discouraged by removing reference to it in reserve information pamphlets or on maps. The Churchill Drive entrance is, however, the most accessible for disabled or elderly visitors to the reserve.

Additional directional signs would be helpful as, at present, there are places where farm access tracks can be confused with the walking track. Setting both the directional and information signs just above the maximum grass height should also be considered as these signs and panels tend to be obscured in late summer when the pasture grasses have reached their full height.

Consideration should be given to extending the palisading on Otatara Pa along the top of the quarry face to create a safety barrier. This barrier would need to be designed to appropriate standards and would required prior authority from the NZ Historic Places Trust.

8.10 INTERPRETATION

Interpretation information can improve visitor appreciation and understanding of Otatara, as well as highlighting cultural restrictions (e.g. eating while on the site) and safety concerns.

Consideration should be given to preparing additional panels to advise visitors that the site is tapu to tangata whenua and consuming food while on the reserve is considered improper. Visitors should also be warned of the steep drop to the south of Otatara Pa where quarrying took place.

A pamphlet providing information about the reserve is available but is now somewhat dated and should be revised and redesigned. This could be done in conjunction with tangata whenua and it may also be possible to involve EIT. They (EIT) have already prepared a bilingual booklet for the use of their crèche.

At present there is no mention of the reserve on the information panel in the Hawkes Bay Area Office, although the reserve pamphlet is displayed. A photograph of Otatara and a short discussion of historic places in the area would illustrate the Department of Conservation's responsibility for historic places on land it administers.

An educational resource kit, for use by school groups, has been developed for the reserve. Otatara is a nationally significant historic place that provides local and visiting schools with an outstanding, and possibly unique learning opportunity. There are probably few major pa close to a large urban population where tangata whenua have retained such close physical and spiritual links.

8.11 PUBLICITY

Appropriate publicity opportunities, in local and national media, should be utilised as a method of heightening public awareness, and appreciation, of the significance of the Otatara archaeological landscape. Although high visitor numbers may present a potential threat to archaeological features in the reserve, appropriate management of those visitors would minimise that threat. High visitor use of the reserve presents an opportunity to increase awareness of historic heritage values. Media coverage should be sought for all conservation works carried out at the reserve. The recent agreement to purchase adjoining land provides a significant advocacy opportunity.

8.12 MONITORING

Comprehensive monitoring is required as part of the effective management of Otatara Pa Historic Reserve in order to:

- Assess the effectiveness of the existing grazing regime,
- Detect changes in vegetation that may lead to detrimental impacts,
- Determine if site management or visitor impacts are having a detrimental impact,
- Determine the most suitable grazing regime to maintain the pasture sward at Otatara without causing damage to archaeological features,

- Ensure public safety measures are adequate and that structures comply with appro priate safety standards.

8.12.1 Monitoring of existing grazing regime

A grazing prescription should be written, in conjunction with the current graziers, including an agreed monitoring programme. This prescription and monitoring programme should be appendices to the written, formalised, grazing agreement. Provision should be made within the agreement for the grazing prescription to be amended if experience shows that changes are necessary.

Regular monitoring should be instituted, preferably in conjunction with the grazier, to ensure that the grazing regime conforms to the agreed prescription. If this is not done, and damage to archaeological features occurs, it cannot be determined if it is the prescription that is inadequate or that the graziers have disregarded the prescription. If the graziers are involved in both the preparation and monitoring of the prescription, they will have a better understanding of the purpose of any restrictions; and may be able to suggest improvements.

Monitoring should include fence lines, gates and water troughs and should be carried out at irregular intervals. For example, it would be useful to monitor the site following heavy rainfall or during prolonged dry spells when ground damage from livestock is most likely to occur.

8.12.2 Monitoring vegetation change

Vegetation change can be effectively monitored through the establishment of a series of fixed photo points at key indicator points. Ideally, the points selected should cover both panoramic views and close up views of specific features. Close up photo points could be used to monitor such things as vegetation change around a raised rim pit, or around a stile, whereas panoramic photo points should be used to record vegetation change on a face prone to erosion, or to record growth and development of restoration plantings. A brief description of the vegetation of the point being photographed should be made at the time the photo point is being established.

8.12.3 Visitor and site management monitoring

A simple walk-through survey could be used to monitor both visitor and management impacts. The checklist of activities to be monitored should include things like graffiti/ vandalism damage, damage to archaeological features by vehicles used in site management, damage caused by informal tracking, deterioration or damage to structures, safety issues related to structures or reserve features.

The checklist should include a place to record remedial action required and who will be responsible for the action. Walk-through surveys should be undertaken at set intervals. In addition to these surveys, informal monitoring would be undertaken during any site visit or after specific management actions. The Hawkes Bay Area Office and the East Coast-Hawkes Bay Conservancy Office should hold copies of the completed inspection form on file.

8.12.4 Monitoring public safety

All structures should be monitored in accordance with Departmental safety standards. All site hazards should be identified and appropriate action taken in accordance with standard operating procedures and Health and Safety requirements.

9.0 RESEARCH

The need for further research in the following area became apparent during the preparation of the conservation plan:

9.1 MONITORING CATTLE IMPACTS ON ARCHAEOLOGICAL SITES

Prior to reservation in 1971, Otatara had probably been grazed with sheep and cattle for *c.*100 years, presumably without regard to its archaeological features. Although there is no way to systematically quantify the deterioration of archaeological features during this period, it is apparent that an array of surface archaeological features survived this grazing regime.

Otatara Pa Historic Reserve is located on the lowland hills of Hawkes Bay on Class VIe2 and VIe5 land (Land Resource Inventory Worksheet 134 – 1974.). It is generally considered that in a standard grazing regime, mature cattle (cows) are best suited to maintaining a suitable sward cover on these classes of land and typically a combination of sheep and cattle are used. Depending on pasture species, sheep become unsuitable for controlling pasture growth, unless they are kept well contained in an intensive grazing system – which may not be possible on these unshaded hills with poor pasture quality. Therefore cattle (cows) become a farmer's tool for maintaining the pasture cover. Overall it is a balanced approach that is required between stock types; pasture growth rate and time of growth rate (S Stokes, pers. comm.).

Although cattle are best able to maintain a suitable pasture sward on these classes of land, dry ewes and wethers can be used if intensively grazed and paddock sizes are kept small (A Gillingham, pers comm.). The smaller paddock size ensures the pasture is more evenly grazed and that stock can readily be moved off vulnerable areas when necessary (Eastwood, 1997).

The key to maintaining the pasture sward at Otatara is in finding the right balance between grazing and long-term protection of the archaeological features. This is likely to involve further sub-dividing paddocks, continuing with the programme of fencing out ridges, retaining a suitable grazier and determining a grazing regime that avoids damage to archaeological features. If cattle could be grazed at Otatara, without detrimental impacts on archaeological features, grazing management options would be increased.

While it is clear that cattle have caused damage to archaeological features in the reserve in the past (Pishief 1997) this may have more to do with the inadequate management of grazing rather than the cattle grazing. Gillingham considers that cattle could be grazed at Otatara over the summer/autumn period, without detrimental impact on the archaeological features, provided that fences were maintained and the grazing carefully managed (A Gillingham, pers comm.). The present graziers support this view (W Hales, pers comm.). If mature cattle are required to maintain the pasture sward a grazing management regime that eliminates damage to the archaeological features is required.

The protection of the archaeological features within the reserve is the paramount consideration, however, grazing is needed to maintain the present vegetation cover that protects those features. If the grazing prescription is too limiting the risk is that it will not be possible to find a willing grazier. Determining a suitable grazing regime, that could possibly include the use of cattle, will require a degree of trial and error and, for obvious reasons, this should not take place within the reserve.

Cattle continue to be grazed on parts of the Otatara archaeological complex that are on privately owned farmland adjacent to the reserve. This provides an ideal opportunity, with landowner approval, to monitor the impact of cattle on these archaeological features to determine whether cattle could be used to help maintain the existing pasture sward in the reserve.

A research and monitoring plan with clearly defined objectives should be prepared. This could be done with the involvement of a tertiary institution such as the EIT Agricultural Section. A suggested project outline is set out as follows:

- Develop formal research proposal,
- Obtain landowner approval for the project,
- Establish a project team that could include representatives from Area Office, Con servancy Office, tangata whenua, the grazier or some other suitable agricultural advisor, NZHPT, NZAA, and an Archaeologist not associated with any of the other participating agencies,
- Establish project responsibilities,
- Determine the current (and past) grazing regime,
- Carry out a baseline condition assessment with the project team,
- Establish photo point monitoring,
- Arrange access to weather records (particularly rainfall observations) for the period to be monitored,
- Prepare a quarterly monitoring checklist that includes records of stock at each site monitoring,
- Photograph the sites from the established photo points each quarter, to coincide with summer, autumn, winter and spring,
- Undertake additional monitoring after significant drought or storm events,
- Maintain contact with the landowner and note any changes to grazing regimes,
- Prepare annual monitoring/climate summaries and distribute them to project team members,
- Continue monitoring for three years, then reassemble the project team and reassess the condition of the site.

A carefully designed grazing regime that takes into consideration factors such as patterns of animal behaviour, stock numbers, seasonal and climatic restrictions, fence line and trough locations may permit cattle to be successfully grazed in some areas of Otatara Pa Historic Reserve in the future. This would have to be within clearly defined parameters, set out in written prescription and closely monitored. It should be noted that the Historic Places Trust does not advocate or support grazing of large stock on archaeological sites (McGovern-Wilson, pers comm.).

10.0 HABITAT RESTORATION

A programme of restoration planting, based on a landscape plan prepared by a landscape architect, began in 1989 but apparently did not continue after the initial year of planting (H. Rook pers. comm.).

Although some of these plantings are now well established, maintenance and infill planting is required. In addition, consideration should be given to continuing the planting begun in 1990 and to extending the restoration to include the rehabilitation of the quarried portion of Otatara Pa. The restoration of Otatara Pa may require the importation of topsoil and either regrassing, replanting, or a combination of the two. Tangata whenua support this suggested restoration and would like to be involved in the work (T. Tareha pers. comm.).

If the restoration programme was recommenced, the revegetation of the gully floors would undoubtedly improve the quality of any water draining from the reserve into the Tutaekuri River and create a more attractive setting for the pasture covered archaeological features. A planting plan should be designed that defines the boundaries of planting areas to ensure that they do not encroach on archaeological features.

A restoration programme would provide an opportunity to showcase this nationally significant historic place and illustrate the Department of Conservation's commitment to the management and protection of historic places on land it administers. A restoration plan would also provide opportunities to enhance biodiversity on the margins of a major population centre. This also provides the opportunity for a joint community, Iwi and Department of Conservation project. The planting could also include species that provide for future cultural use.

11.0 Remedial work specification

The following work is recommended in order to enhance the management of the historic reserve.

Palisades (section 2.3):

- Repairs to the interpretative palisades on Otatara Pa should be undertaken, as specified in the structural engineering assessment - Appendix 4. Any necessary permits or consents should be first obtained.

- Prior to undertaking any repair work Hawkes Bay Area Office staff should inspect the structures with tangata whenua representatives. The purpose of the inspection would be to identify which elements of the structures on Otatara Pa will be repaired and subsequently maintained. For example, if the roof structures over pits are not going to be maintained, they should be removed.

Visitor facilities (section 8.9):

- A suitably qualified landscape architect should prepare a carefully designed entrance, toilet block and car park, which draws in the appropriate design elements of the reserve and the relationship of tangata whenua to the land.

- This new entrance and car park design should be implemented.

Interpretation (section 8.10):

- Interpretation panels, the reserve pamphlet and Hawkes Bay Area Office information on Otatara Pa Historic Reserve should be reviewed and redesigned by a suitably qualified specialist.

- This new interpretative material should be produced and distributed.

12.0 Regular maintenance specification

The primary function of regular maintenance is to ensure early identification and remedying of problems. The following regular maintenance tasks are required:

Vegetation (section 7.1.3):

- Annual control of kanuka, and other woody species, is required to ensure that they do not encroach onto archaeological features.

- Weed spraying should be undertaken to control gorse, blackberry and potato vine, smilex (*Asparagus asparagoides*), tradescantia (*Tradescantia fluminensis*) and other environmental weeds.

Visitor facilities (section 8.9):

- Regular maintenance of all visitor facilities should be completed, including mainte nance of any safety barriers to Departmental standards.

- Maintenance of reconstructed palisades on Otatara Pa will be required after reme dial work (section 11) has been carried out.

Interpretation (section 8.10):

- Regular maintenance of all interpretation structures is required.

13.0 Recommendations

Reserve Administration:

Management status (section 1.3):

- All reserve management and conservation work carried out at Otatara Pa Historic Reserve must comply with the requirements of the Historic Places Act (1993). All work that requires ground disturbance will require authority to modify to have been sought and obtained from the New Zealand Historic Places Trust.

Kaitiakitanga (section 1.4):

- Ngati Paarau should have an integral role in all aspects of reserve management.

Changes to the conservation plan (section 1.7):

- Any management proposals not within the scope of this plan require a plan change before they may proceed.

Threats Management (section 7):

Fire (section 7.1.1):

- Departmental specialist advice should be sought to develop fire control pre-plan ning to ensure that earthmoving machinery, or fire line construction, does not dam age the archaeological features.

Visitor impacts (section 7.2.1):

- A visitor management programme, including visitor surveys and monitoring, should be established.

- A policy for the control of mountain bikes, motorbikes and horses is required.

- Tracks should be clearly defined.

- The future of open air concert and similar activities should be discussed with tangata whenua.

Machinery use (section 7.2.2):

- No earth moving machinery, or machinery likely to cause ground disturbance dur- ing normal operation, should be used in the reserve without prior consultation with the NZ Historic Places Trust.

Management impacts (section 7.2.3):

- Archaeological advice should be sought, prior to any management activities under taken in the reserve.

Grazing (section 7.3):

- Livestock should be carefully managed and closely monitored.
- Regular and ongoing communication should be maintained with the reserve grazier.
- A formal written grazing prescription, including a monitoring programme should be developed in conjunction with the grazier (section 8.12.1).
- Damage to archaeological features through trampling and tracking should be avoided.
- Rabbit control may be required.
- Consideration should be given to: providing stock with areas for camping that are not on archaeological features, artificial hardening in gateways and around water troughs, extension of the ridge fencing programme, further reduction of paddock sizes.

Information loss (section 7.4):

- A document bank should be established to hold information relating to the conserva tion and management of the reserve.
- All work carried out at the reserve should be documented and held on file at Hawkes Bay Area Office, and copied to East Coast-Hawkes Bay Conservancy Office (section 8.6).

Reserve Management (section 8):

Standards of conservation (section 8.1):

- This conservation plan should guide all work carried out at Otatara Pa Historic Reserve.

Legal requirements (section 8.2):

- Management of the historic reserve must comply with the relevant legislation.
- The Department of Conservation should pursue having the Historic Places Trust registration category for Otatara Pa upgraded from its existing Category II status to Category I.
- The department should advocate the registration of archaeological features that are currently in private ownership, adjacent to the reserve.

Specialist advice (section 8.3):

- All management proposals should be discussed, and agreed, with appropriate specialists.

Intervention (section 8.4):

- The minimum possible intervention with archaeological features should occur.
- Interpretative structures should be restricted to the modified areas of Otatara Pa.
- Newly introduced elements must be clearly identified (including fence post holes).

Approved use (section 8.5):

- Management and use proposals should be consistent with the approved use under the historic reserve designation.

Mapping and condition survey (section 8.7):

- Detailed mapping, and a comprehensive condition survey, of the Otatara archaeo logical complex should be undertaken.

Integrity of setting (section 8.8):

- The Department of Conservation should pursue the purchase, or protection by covenant, of significant archaeological features located on adjacent private land.
- The creation of a buffer between the historic reserve and encroaching urbanisation is desirable.

Visitor facilities (section 8.9):

- Refer also to remedial work (section 11).
- Consideration should be given to the future role of the Churchill Drive reserve entrance.
- Additional directional signage should be considered.
- Signage should be set above the maximum grass height.
- The reconstructed palisade on Otatara Pa could be strengthened and extended along the quarry face to form a safety barrier (section 2.3 and section 11).

Interpretation (section 8.10):

- Refer also to remedial work (section 11).

- The educational resource kit that has been developed for the reserve should be made available for use by schools.

- Interpretation could include guided walks managed and undertaken by Ngati Paarau.

Publicity (section 8.11):

- Appropriate publicity opportunities, in local and national media, should be utilised as a method of heightening public awareness, and appreciation, of the significance of the Otatara cultural landscape.

Monitoring (section 8.12):

- A long term monitoring program should be developed.

- A formal written grazing prescription, including a monitoring programme should be developed (section 8.12.1).

- Monitoring of vegetation change should be undertaken (section 8.12.2).

- Visitor and site management monitoring should be undertaken (section 8.12.3).

- Monitoring of public safety (section 8.12.4) is required.

Research (section 9.0):

- It is recommended that a research and monitoring project to examine cattle impacts on archaeological features adjacent to the reserve is developed and implemented.

Habitat Restoration (section 10.0):

- A revegetation programme, including provision for future cultural use, should be developed for the reserve.

- A planting plan should be designed that defines the boundaries of planting areas to ensure that they do not encroach on archaeological features.

- Consideration should be given to the rehabilitation of the quarried portion of Otatara Pa.

ACKNOWLEDGMENTS

We gratefully acknowledge the assistance of the following people during the preparation of this report:

- Pam Bain (Department of Conservation, East Coast-Hawkes Bay Conservancy) initiated the project, provided logistical support and useful discussion throughout the preparation of the report, and convened a working party to consider an initial draft of this report.

- Tipu Tareha (Ngati Paarau) provided the traditional history of Heretaunga, and the role of Ngati Paarau of Waiohiki Marae (as Kaitiaki and Mana Whenua) in the current management of the site.

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BIBLIOGRAPHY

Bowers L. 1998: Te Koru Pa Historic Reserve Conservation Plan. Prepared for the Department of Conservation.

Department of Conservation 2001: Otatara Pa Historic Reserve Conservation Management Plan 2001. East Coast-Hawkes Bay Conservancy.

Eastwood K. 1997: Pasture sward management on the Otatara Pa site. Unpublished report. Copy held by Department of Conservation, East Coast Conservancy. 3 pp.

Gillingham A.G. and Gray M.H. 1999: Otatara Pa Historic Reserve Revegetation Programme. Progress report. DOC Contract, Napier.

Grant P.J. 1996: Hawkes Bay forests of yesteryear. Patrick J. Grant, Havelock North. 273 pp.

ICOMOS New Zealand 1995: ICOMOS New Zealand Charter for the conservation of places of cultural heritage value. ICOMOS New Zealand, Auckland. 4 pp.

Jones K.L. and P.G. Simpson 1995: Archaeological Site Stabilisation and Vegetation Management Case Studies I. *Science and Research Series 84*. Department of Conservation.

McEwen W.M. 1987: Ecological regions and districts of New Zealand. Sheet 2. 3rd revised edition and four 1:15,000 maps. *New Zealand Biological Resources Centre Publication No. 5*. Department of Conservation, Wellington. 61 pp.

Ministry of Works 1974: Hawkes Bay Region. *Land Resources Inventory Worksheet 134*. Government Printer, Wellington.

Ministry of Education 1997: Social studies in the New Zealand curriculum. Learning Media Ltd, Wellington.

Pishief E. 1997: Assessment of heritage significance - Otatara Pa Historic Reserve. Department of Conservation, East Coast-Hawkes Bay Conservancy.

Seelye C.J. 1940: Variability of annual rainfall in New Zealand. *New Zealand Journal of Science and Technology No. 22*. pp. 186-216.

APPENDIX 1 REGISTER ENTRY, EAST COAST-HAWKES BAY CONSERVANCY REGISTER OF ACTIVELY MANAGED HISTORIC PLACES

Name: Otatara Pa Historic Reserve **Built:** 15th Century

Record updated: May 1998

1. Description

Themes: Maori settlement, defence, farming
Land Status: Historic Reserve
Location: NZMS260 V21 390 770
Controlling Authority: DOC/Waiohiki Marae

Present Management Status:

NZAA Site Record: V21/41, V21/168
Specified in CMP: Yes
Registered by HPT: Reg. No. 6418
Conservation Plan: Management Plan 1977

Present Use and Visitor Facilities: Recreation, Car park, Directional signs, Access track and Site Panels.

Physical Description: This historic reserve covers 33 hectares, although the whole settlement area is about 40 hectares. It is one of the largest pa in Hawke's Bay. It incorporates Otatara Pa (on the lower part of the hill and now almost entirely quarried away) and Hikurangi Pa (500 metres higher up on the ridge). Numerous pits and terraced house sites have been built along the hills. The Waiohiki Marae have built palisading and pou on the reserve close to the road.
Integrity: Very good *Condition*: Good

History: The traditional history of Otatara is made up of many versions of the stories about the original inhabitants, the pa builders, and the battles over Otatara. But the crucial event is that the Ngati Kahungunu under Taraia arrived in Heretaunga and Otatara is the place that commemorates that arrival. Taraia's arrival has been variously described as a bloodless conquest, a truce, a conquest of Otatara and he is said to have established his mana over Heretaunga by peaceful means, judicious political marriages, and/or by fighting and pushing out the original inhabitants. The stories reveal the different perspectives of the groups associated with Otatara and the importance of Otatara to the people of Heretaunga because everyone has connections to it through whakapapa.

2. Assessment

Physical/Architectural Significance: Otatara is considered one of the country's most striking extant pa sites, with expansive views of the bay and the mountains to the west. The system of terraces, house sites and pits is extensive and, apart from the quarried section, in good condition, although there is some degradation on the ridge lines.

Historic Significance: Otatara is of great significance to Maori people, in particular the many local hapu who can trace their ancestry back to the occupants of this ancient pa. It is a monument to all the people of Heretaunga, both the original inhabitants and the newcomers. Otatara's strategic and social importance is evidenced by its huge size and situation on the Redcliffe hills.

Site Quality: Occupies a magnificent site on the Redcliffe hills behind Taradale with views to the coast and to the inland mountains.

Future Use: Recreation, education.

Future Management:

1. Consult with local iwi (KO 2.1)
2. Prepare conservation plan (KO 4.5)
3. Schedule conservation work in annual business plan (KO 4.5)
4. Provide interpretation; visitor programme; publication (KO 8.0)

Threats: Careless stocking and neglect will hasten the deterioration of the physical features.

DOC EAST COAST/HAWKE'S BAY CONSERVANCY: HISTORIC PLACES REGISTER

NAME: **Otatara Pa Historic Reserve**

Record Updated: May 1998

Photo taken (8/92 (P Bain)

Scale 1:50 000

Source NZMS 260 V21

APPENDIX 2 DESCRIPTION OF ARCHAEOLOGICAL FEATURES – KEVIN JONES, SCIENCE AND RESEARCH UNIT, DEPARTMENT OF CONSERVATION HEAD OFFICE ASSESSMENT OF HERITAGE SIGNIFICANCE - FROM PISHIEF (1997) OTATARA PA HISTORIC RESERVE PP 56-62.

Otatara Pa - description

Otatara is the smaller pa now destroyed by quarrying, on the south-east corner of the Reserve. This description is based on the RNZAF aerial photographs: S.N. 18: J.10 & 11, 3 February 1936.

From the north, the pa is approached by a shallow, featureless saddle via 70 m of ridge to a transverse double bank with interior ditch (Fox's ditch and bank No. 1), 18 m wide and 9 m from outer scarp to the top of the inner bank. The general rise in the slope shows that the defences were against attack from the saddle to the north. The ridge from the saddle is featureless on its south-western side but there are several pits on its crest. On the north-east face towards the saddle is a wedge-plan terrace opening out into a broad saddle. Below that again is a long, lateral scarp and terrace (about 3 m wide) apparently of defensive intent, which continues through a rise, and a similar second scarp and terrace - slightly wider - and terminates at the north-eastern end of the ditches and banks.

Within the defences the ridge rises abruptly about 5 m in height to the central platform which is about 33 m long and 22 m wide. The platform has a house terrace to the north-east and falls away to the south-west above a former slope. Any features which may have been on this slope have been destroyed by the earthquake-induced slump. There are also pits or house floors on the eastern end of the platform which define that end of the platform. The northern side of the platform is a shallow terrace and further north again, the platform drops away by a steep, high scarp to a lateral terrace which runs the full length of the platform and is about 4.5 m wide.

Below the platform, or tihi, the ridge trends down slightly north of east for some 60 m and then curves around, on the level, to the head of a steep slope which leads down to what was the river-cut face on the south-east. This ridge line falls to the south into an open basin with a few pits and terraces. On its crest are a few pits and on the north a series of terraces 3-4 m wide and up to 30 m long which are spread out along the northern slope and following the level. The east or north-east face of the natural return in the ridge steps down about 15 m through a series of four defensive transverse scarps and terraces which are each about 25 m long and some of which are carried around to the northern face. The lowest of these terraces is 15 m x 20 m and triangular in plan. This was evidently the main defensive line to the east. Below it the ridge narrows, falling over a horizontal distance of some 120 m to the level of the alluvial plain. A few terraces commence on the upper part, carried around to the north. At the very base of the ridge are two small terraces cut on the crest.
These ridge features are separated by a moderately steep slope falling some 40 m vertically to a group of terraces above the narrow gully which commences on the south side of the Hamilton slope and carries down to the intersection with east valley south. Some of these terraces survive, (one of which was excavated by Mary Jeal in 1990), and they cover an area

of 110 m x 20 m at the very foot of the slope. By 1936, they appear to have suffered a slump towards the eastern end, which cut through three tiers of terraces. There are large pits on the eastern most group of terraces. To the west, the terraces are bounded by Fox's ditch and bank No. 2 which is still extant north of the southern gully feeding into east valley south. The southern extension runs for some 24 m south of the gully to the toe of the hill rising up to the eastern end of the tihi of Otatara (the quarried pa) where it makes a return to the east along the toe for a distance of about 15 m. This length of ditch and bank shows in the 1890's Hamilton photograph. The nature of this return does not suggest that the ditch and bank has a nineteenth century age for the ditch and bank, and perhaps for the enclosed terraces, Jeal's radiocarbon date results notwithstanding. These terraces provide an interesting separate settlement unit, sheltered and sunny, protected by the slope behind, the ditch and bank, and what may have been swampy valley, or gully floor to the north and north-east.

The Hamilton slope to the north provides one broad approach to the southern aspects of Hikurangi and for this reason, Fox's No. 2 ditch and bank there has been regarded as defensive. On the Hamilton slope proper (between the two gullies) the ditch and bank is 83 m long and is 4 m from counter scarp to the top of the bank. The area of the slope is featureless both in the large area enclosed to the east between the bank and the edges of the two gullies and to the west on the slope running up to the face of the south ridge and the lower south-east ridge. The function of this ditch and bank is therefore a conundrum which requires archaeological investigation. Archaeology would show, for example, whether there was palisading and whether there was a ditch on both sides of the bank.

Possible ditch and bank fences

Some ditch and bank features on Otatara Pa Historic Reserve, conventionally interpreted as defensive, may be fences. This type of fence went out of use by the 1880s. They are prominent on Kohukete, a large pa some 10 km to the north of Otatara. The main possible fence line is the one running across the slope above the car park and through which formal and informal access tracks run (Fox's No. 2 line). This ran across the broad slope to the foot of the north face of Otatara. It is noticeable that the lower terraces on Otatara cease abruptly on their western flank at this line. There may be a functional relationship between the lower slope terraces and this line.

If this is a ditch and bank fence, then it probably enclosed or excluded stock being held by the inhabitants of the lower terraces or others living on the flat land beside the Tutaekuri. Ploughing of a field established on these slopes would explain the relative lack of surface features. However, no lands (the banks formed by repeated passes of the plough) are able to be detected on aerial photographs.

Hikurangi Pa - description

The central and highest platforms on Hikurangi have no apparent ditch and bank defences, but they do exhibit pronounced scarping, probably of defensive intent, on most sides. The platforms are spaced along the central ridge line over 220 m altitudes between 125 m and 140 m above sea level. The terraced ridges and faces radiate out to the west, south-east and south of the platforms.

This description is based on aerial photograph stereo pairs R.N. 1702/30, 16 May 1949. Where terraces are described they are probably for habitation unless the context makes it clear that they lie at the foot of defensive scarps.

North-west platform

At about 140 m above sea level, this is the highest of the platforms and has a plan area of 65 m x 33 m. There is a slight scarp to the south and east (regarded as part of the platform) and then a steep, high scarp, probably defensive, to a long lower terrace 50 m long and 5 m wide. To the east is a line of two or three raised-rim pits on a lower terrace and a descent through a few poorly drained terraces to the head of the gully south of Institute ridge. There is a possible defensive scarp on the west of the platform and a mild slope along most of the platform's northern edge with no obvious scarping or terracing. The platform descends to the south-east by a narrow ridge flanked by well-defined terraces on the west to a narrow featureless saddle which rises again to the south-east to the central or main platform.

The *north ridge* is narrow with levelling of its crest and it joins, through a large natural more or less level area, on to the head of the Institute ridge. The near-level area extends around the head of the gully south of the Institute ridge. There are a few isolated rectangular storage pits at the head of the Institute ridge. Further down the Institute ridge towards the Reserve boundary are large natural terraces, possibly enhanced by human hand.

Across the north ridge less clear and well defined at its crest, commencing 20 m from the northern side of the platform is *Fox's 3 ditch and bank*, running due east for about 50 m to the advancing erosion face (of long-standing) at the head of the gully south of the Institute ridge. The ditch is on the north side. From bank to outer side of the ditch is about 3.2 m and the total height from the base of the ditch to the top of the bank is about 2 m decreasing as one approaches the crest of the ridge to the west.

West ridge north runs south-west from the platform and has a flight of closely spaced terraces on its south side, covering an area of 80 m x 50 m in plan and steeping down to the advancing erosion face at the head of the gully. There are further terraces at the lower end of the ridge worked into the northern end up 200 m from the platform. There is some possible defensive scarping at this western end.

Central platform. This platform is triangular in plan, presenting high defensive scarps to the north-east (30 m long) to the west (45 m long) and the south-east (45 m long). To the south-east the terrace below the defensive scarp falls steeply to the head of the gully south of south-east ridge. There are indistinct pits on the west side of the platform. The defensive scarp on the west fall some 8-10 m to a long terrace 65 m x 5 m in plan which extends along to the south-west to form the western defensive scarp of the south platform. (This platform is just above the line of the road.)

The *south-east ridge* adjoins the central platform through two defensive scarps descending from the platform to the head of the ridge by some 25 m. The ridge is 340 m long falling to about 70 m above sea level at its eastern extremity where it directly overlooks the Tutaekuri flats. Outside the Reserve boundary further terraces were probably cultivated before 1949

since the change to bare ground seems arbitrary. The ridge is extensively terraced on the south side and to a lesser extent on the north. On the north the terraces take the form of irregular, but more or less level, long terraces (up to 80 m long) and 3-5 m wide, running up to 50 m (horizontal distance) down the slope towards, but not into, east gully north. These form a wedge appearance in the plan view as they trend out to the north and west from the descending ridge crest. A few pits, rectangular, up to 8 m x 4 m lie on the terraces. A similar pattern applies on the south side but more especially within 15-20 m horizontal distance of the crest. A number of small blunt ridge ends form the lower slopes of the ridge above the actively eroding gully on the south side. They are extensively and deeply scarped and terraced, the scarps possibly being defensive.

South platform and Best face. This platform is a large unit about 80 m long x 50 m wide on its southern face. A low relief central ridge line has a few indistinct pits. There is probable defensive scarping to the south above the steep Best face, continuing around the head of west ridge south and on to the north-west facing side joining in an irregular fashion with the terrace and scarp described above on the west of the central platform.

To the south on the *Best face and the eastern face* is a very extensive area (110 m x 60 m) with many terraces. These are generally small, especially on the steep eastern face, but are commonly up to 14 m x 10 m in plan on the Best face. A notable feature is the discontinuity in the plan of the terraces either side of the platform down the Best face to the head of the south ridge. This suggests that this line may be an access way through the pa of some antiquity and dating to the period of occupation.

The *west ridge south* descends to the south-west from the south-western corner of the south platform. It has a central flat area about 20 m x 50 m in plan at about the level of the corresponding level area of the south ridge which is about 70 m to the east. Below this to the north and south are several tiers of more or less continuous terracing, with especially steep high scarps to the south. A further 80 m down the ridge there is an area of strong, possibly defensive scarping. The ridge crest here is marked by lines of rectangular pits, the largest of which is 8 m x 4 m and other about 6 m x 2 m in plan.

The *south-west ridge* is in two more or less level segments. The upper one is about 100 m x 13 m in plan and has a large concentration of raised-rim pits on its crest and on small terraces on its southern flank above a broad terrace about 30 m x 8 m in plan. There are about 14 distinct pits, the largest of which are about 8 m long. The faces of this upper segment are not terraces, although a few reappear on the level around the south side. The lower unit is about 60 m long with a featureless central ridge line flanked to the north-west and the south-west by tiered terraces which extend about 25 m to the north-west, less to the south. The bottom terraces are wider and have higher scarps than the rest while the lowest north-western terrace runs, more or less level and continuously, around to the gully which cuts off the lowest terraces on the south side of west ridge south. There are further pits to the south-east of the southern part of the lower unit.

The *south ridge* extends south from the base of the Best (south) face with a level plan area of about 50 m x 12 m. Pits lie on the level area and on terraces on the crest of the ridge which turns again to run across the east-facing slope above the Hamilton slope and the lower south-east ridge.

The *lower south-east ridge* forms the northern side of the Hamilton slope. On the north is a mild slope to the east gully (south of the south-east ridge). It is terraced on its upper south-east facing slopes. Above this is a broad naturally level area with some large pits. This area then rises to the terraces of the east face of the south platform and the south ridge.

APPENDIX 3 NEW ZEALAND ARCHAEOLOGICAL ASSOCIATION SITE RECORD FORM

APPENDIX 4 STRUCTURAL ENGINEERING REPORT ON PALISADES

Assessment report

Site Number: 2034
Structure Numbers: 42852, 42853 and 42857
Structure Name: Otatara Palisades

1. REPORT TYPE

Structural Engineering Report.

2. ASSESSMENT

2.1 System

Site inspection was undertaken 7 Nov 01.

3.5+ metre high palisades were constructed 89/90 at Otatara Pa site as a replica of the historic defensive perimeter. The palisades are a feature of the site and would not constitute an asset "used" by visitors, and walkway routes tend top ass by the structures rather than follow alongside. Warning signs have been positioned to guard against the potential hazard of these fences falling over.

Although most timber is NZ-grown kanuka, main support poles are hardwood "ex-telegraph", and galvanised steel bolts and No. 8 wire are also used.

2.2 Foundations

Part of palisade 42852 has collapsed and it is evident that one of the main hardwood support poles has rotated in the ground. It is apparent that the pole embedment has not been adequate to resist wind loadings.

It was possible to shunt poles of palisade 42853 back and forwards by manual pushing and this indicates that pole embedment here is also inadequate.

For other palisades where it was not possible to "wobble" main support poles, it may be that foundations were dug by different work gangs, or soil could be firmer or wind shelter greater. In these cases, pole embedment appears more satisfactory and remedial work could be considered unwarranted, or unwarranted as yet.

2.3 Sub-frame

2.4 Beams

Horizontal walers or rails comprise untreated kanuka of diameter varying from 75 to 150 mm and these support vertical palisade elements. Connections to main poles are bolted.

Kanuka is generally considered a "perishable" NZ-grown timber with lifespan in the 5 year range and elements of palisade 42857 in particular are rotting or rotten. Timber will be rotting about bolt holes, also, and fixings are loosening, with capacity marginal.

Walers need to resist wind loads at right angles as well as dead loads of the fence timbers and this means that minimum diameters should be maintained over the full span length. Timber at a bolt fixing on palisade 42852 has failed due apparently to a wind and dead load combination.

2.5 Decking

2.6 Kanuka Fence

Sawn kanuka would not be appropriate for use in structure applications or for any medium-long term use. Due to the secondary nature of the vertical kanuka infill, however (rot in any one vertical being unlikely to pose a risk to any site visitor), one could remove any rot-affected section with a view to replacing later.

2.7 Other

3. UPGRADE RECOMMENDATIONS

3.1 System

The long term expectations for the replica palisades at this site need to be confirmed, e.g. how much to remain, maintenance responsibilities, etc.

I consider that main structural components need to assuredly have good durability but that secondary kanuka verticals could be progressively removed and replaced over the years. Assessment Drawing 2034/42852 is provided on this basis - and an be adopted for all palisades at this site.

3.2 Foundations

Hardwood, or treated pinus radiata poles, need to be refounded as per the above drawing on palisades 42852 and 42853.

Poles of other palisades should be monitored for any "wobble" when shoved and embedments should be improved as necessary (remaining palisade poles might need to be progressively re-founded over 10 years for example).

3.3 Sub-frame

3.4 Beams

Horizontal walers of palisades 42852 and 42857 need to be replaced in accordance with the above drawing, and walers of palisade 42853 should be re-checked for rot.

Walers of remaining palisades should be replaced progressively over 5 years.

It might be possible to obtain a more authentic look by treating shaved kanuka poles (for durability) but please refer back to Engineer for specification check in this instance.

3.5 Decking

3.6 Kanuka Fence

Remove any sections where timber or fixings do not sustain manual shove.

Replace at will.

3.7 Other

4. COMMENTS

I am unsure whether the aesthetics of "letting sections of palisade crumble" will spur the Department or other interested parties into action.

It is difficult to quantify risk associated with various failings noted above. I believe greater risk lies with the possibility of whole panels breaking off in a strong wind and hitting either site visitors or landing on/near the adjacent roadway (latter seems less likely due to weight and "solid" ratio of panels).

I would assess risk to visitors of individual wood chunks falling, or of pole foundations rotating, as slight or insignificant. The possibility of kids climbing over the palisades would raise concern and hasten need for action.

I would categorise remedial work as needing to be undertaken within a two-year maintenance period rather than consider this work urgent, especially considering that warning signs are already present. Unless work can be schedules within one year, however, I believe we should re-evaluate warning provisions and visitor access at the site with a view to structure demolition or full closure within two years at outside.

Alan Dallas, DOC Structures Engineer

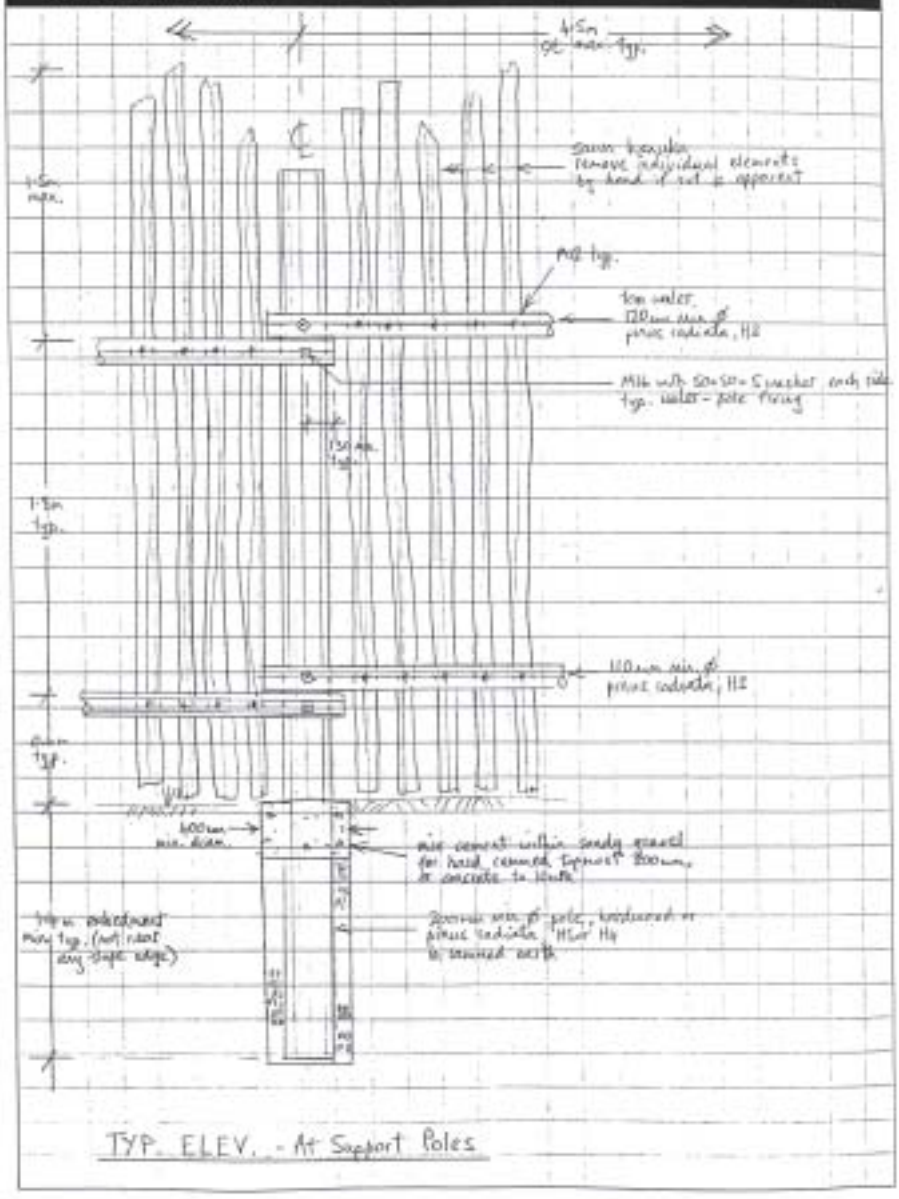
Department of Conservation
Te Papa Atawbai

sheet 01 of 01

OTATARA

Inventory Number
2034 042852
Site Structure
AD A.0.02

ASSESSMENT DRAWING



TYP. ELEV. - At Support Poles

APPENDIX 5 VEGETATION AND HABITATS

1. (Scotch thistle)/(woolly mullein)/*Microlaena stipoides*-sweet vernal-Yorkshire fog-ratstail grassland

This vegetation type covers the majority of the site. Species composition and relative abundance varies throughout the site. *Microlaena stipoide*s, sweet vernal (*Anthoxanthum odoratum*), Yorkshire fog (*Holcus lanatus*), and ratstail (*Sporobolus africanus*) are common throughout and form a low, dense groundcover with occasional emergent Scotch thistle (*Cirsium vulgare*) and woolly mullein (*Verbascum thapsus*). Ryegrass (*Lolium perene*), browntop (*Agrostis capillaris*), soft broome (*Bromus hordeaceau*), and hawksbeard (*Crepis capillaris*) are scattered throughout, with windmill grass (*Chloris truncata*), barley grass (*Hordeum murinum*), Mexican tea (*Chenopodium ambrosioide*s) and mat amaranth (*Amaranthus deflexus*) locally common.

Woolly mullein is locally dominant on hillslopes where stock trampling has exposed bare soil (see Plate 3).

Ryegrass, Mexican tea and mat amaranth are common in pits and on ridges where sheep have been camping.

2. Kanuka treeland

Scattered kanuka (*Kunzea ericoide*s) up to 6 m tall forms an open canopy over bare soil and scattered *Microlaena stipoide*s. Potato vine (*Solanum jasminoide*s) and mat amaranth form a low dense ground cover in places. In large canopy gaps and the gully floor *Microlaena stipoide*s, sweet vernal-ratstail grassland occurs. In damp areas of the gully floor *Juncus gregiflorus* is common. (Plate 5)

3. Ngaio shrubland

Planted ngaio (*Myoporum laetum*), up to 6 m tall, forms a discontinuous canopy. Blackberry (*Rubus* sp.; *R. fruticosus* agg.) and occasional gorse (*Ulex europaeus*) occur in the understorey, with occasional planted taupata (*Coprosma repens*) and harakeke (*Phormium tenax*).

Ground cover is predominately grasses and herbs with occasional dense patches of potato vine. Groundcover species include *Microlaena stipoide*s, tall fescue (*Schedonorus phoenix*), cocksfoot (*Dactylis glomerata*), sheep's sorrell (*Rumex acetosella*), and hawksbeard.

4. Ngaio-*Pittosporum ralphii*-tree lucerne-crack willow forest

Planted ngaio, *Pittosporum ralphii*, and tree lucerne, together with crack willow (*Salix fragilis*) up to 12 m tall are dominant in the canopy, with occasional kowhai (*Sophora tetraptera*), tarata (*Pittosporum eugenioide*s), kanuka, kohuhu (*Pittosporum tenuifolium* subsp. *tenuifolium*) and ti kouka (*Cordyline*

australis). The understorey is sparse. Planted mapou (*Myrsine australis*), taupata and harakeke occur in places and blackberry is common throughout. Ground cover is variable. In places where the canopy has closed, leaf litter is predominant, but where light penetrates to the forest floor, and around the margins, chickweed (*Stellaria media*), cleavers (*Galium aparine*), Mexican tea, blackberry, fennel (*Foeniculum vulgare*), cocksfoot, Yorkshire fog and tall fescue are common. Ever lasting pea (*Lathyrus latifolius*), smilex (*Asparagus asparagoides*) and potato vine occur in places.

5. Ngaio-tree lucerne-kohuhu-manuka-kanuka-tutu shrubland

This vegetation type is variable. Ngaio, tree lucerne, kohuhu, and, in places, manuka (*Leptospermum scoparium*), kanuka and tutu (*Coriaria arborea*) form a low discontinuous canopy up to 3 m tall. Ti kouka and karamu (*Coprosma robusta*) are also present, and a small stand of poplar (*Populus* sp.) occurs below the pa. In the more open areas, fennel, blackberry, bracken (*Pteridium esculentum*), *Microlaena stipoides*, cocksfoot, Yorkshire fog, and paspalum (*Paspalum dilatatum*) are common, with occasional *Poa anceps, Calystegia silvatica* and potato vine. Pampas (*Cortaderia* spp.) is locally common. Firethorn (*Pyracantha angustifolia*) occurs in places. (Plate 6)

Plate 6: Look south-east to Otatara Pa with Waiohiki Marae in upper left of photo.

6. Tree lucerne-(crack willow) forest

Tree lucerne, with occasional crack willow, up to 8 m tall, forms an intermittent canopy. Occasional kowhai and ngaio are also present. Gorse, pampas, and black berry dominate the understorey, margins and canopy gaps, with occasional karamu, koromiko (*Hebe stricta* var. *stricta*) and tarata. Ground cover is variable. Cocksfoot, calastegia and tall fescue are common, and tradescantia *(Tradescantia fluminensis*) and potato vine occur in places. Under areas of closed canopy, leaf litter is predominant.

7. Kowhai-*Pittosporum ralphii*-(ti kouka) forest

Kowhai, *Pittosporum ralphii* and occasional ti kouka up to 12 m tall form a canopy over karamu, *Pittosporum ralphii* saplings and occasional *Phormium tenax*. Blackberry is common on the margins and in canopy gaps, and gorse is common on the old quarry face. Occasional smilex occurs in the lower understorey and *Pteris tremula* is scattered throughout.

8. Fennel-blackberry/*Microaena stipoides*-cocksfoot-Yorkshire fog-paspalum grassland

Microlaena stipoides, cocksfoot, Yorkshire fog and paspalum are common, with frequent emergent fennel and locally dominant blackberry. Areas of bare ground are common with occasional pampas, *Calystegia sylvatica* and potato vine.

Ground cover under the canopy is predominantly leaf litter with local *Microlaena stipoides*. In canopy gaps potato vine often forms dense low growing mats.

APPENDIX 6 VASCULAR PLANTS OF OTATARA PA HISTORIC RESERVE (NZMS260 V21 390769)

* = Planted

Indigenous Species

Monocot. trees and shrubs

Cordyline australis	ti kouka
*Phormium cookianum**	whararíki, mountain flax
Phormium tenax	harakeke, flax

Dicot. trees and shrubs

Brachyglottis repanda s.s.	rangiora
*Coprosma repens**	taupata
Coprosma robusta	karamu
*Dodonaea viscosa**	akeake
Hebe stricta var. *stricta*	koromiko
Kunzea ericoides var. *ericoides*	kanuka
*Myoporum laetum**	ngaio
Myrsine australis	mapou
Pittosporum eugenioides	tarata
Pittosporum ralphii	
Pittosporum tenuifolium subsp. *tenuifolium*	kohuhu
Sophora tetraptera	kowhai

Dicot. lianes

Calystegia sepium	pohue
Muehlenbeckia australis	puka

Ferns

Pteris tremula	turawera (shaking brake)

Grasses

Lavatera cretica	Cretan mallow
Microlaena stipoides	patiti
Poa anceps subsp. *anceps*	

Rushes

Juncus gregiflorus	wi

Monocot. herbs (other than orchids, grasses, sedges and rushes)

*Phormium cookianum**	
Phormium tenax	harakeke, flax

Dicot. herbs (other than composites)

Euphrasia cuncata

Adventive Species

Dicot. trees and shrubs

*Acacia melanoxylon**	Tasmanian blackwood
Berberis glaucocarpa	barberry
Chamaecytisus palmensis	tree lucerne
Cytisus scoparius	broom
Lupinus arboreus	lupin
Malus ´ domestica	apple tree
Paraserianthes lophantha	brush wattle
Populus alba cv. Nivea	silver poplar
Rosa rubiginosa	sweet brier
Rubus sp. (*R. fruticosus* agg.)	blackberry
Salix cinerea	grey willow
Salix fragilis	crack willow
Ulex europaeus	gorse

Dicot. Lianes

Rumex sagittatus	climbing dock
Solanum jasminoides	potato vine

Grasses

Agrostis capillaris	browntop
Agrostis stolonifera	creeping bent
Anemanthele lessonii	
Anthoxanthum odoratum	sweet vernal
Avena barbata	slender oat
Bromus hordeaceus	soft brome
Bromus willdenowii	prairie brome
Chloris truncata	windmill grass
Cortaderia jubata	pampas
Cortaderia selloana	pampas
Cynodon dactylis	Indian doab
Cynosurus cristatus	crested dogstail
Dactylis glomerata	cocksfoot
Digitaria sanguinalis	summer grass

Holcus lanatus	Yorkshire fog
Hordium murinum	barley grass
Lolium perenne	rye grass
Panicum dichotomiflorum	smooth witch grass
Paspalum dilatatum	paspalum
Paspalum distichum	Mercer grass
Pennisetum clandestinum	kikuyu grass
Poa trivialis	rough stalked meadow grass
Rytidosperma racemosum	
Sagittaria graminea spp. *platyphilla*	sagittaria
Setaria gracilis	
Setaria verticillata	rough green bristle grass
Setaria viridis	green bristle grass
Sporobolus africanus	ratstail

Rushes

Juncus effusus	soft rush

Monocot. herbs (other than orchids, grasses, sedges and rushes)

Asparagus asparagoides	smilax
Iris foetidissima	stinking iris
Tradescantia fluminensis	tradescantia

Composite herbs

Carduus nutans	nodding thistle
Carduus tenuiflorus	winged thistle
Cirsium arvense	California thistle
Cirsium vulgare	Scotch thistle
Conyza albida	fleabane
Crepis capillaris	hawksbeard
Hypochoeris radicata	catsear
Picris echioides	oxtongue
Sonchus asper	prickly puha, prickly sow thistle

Dicot. herbs (other than composites)

Amaranthus deflexus	mat amaranth
Anagallis arvensis	scarlet pimpernel
Chenopodium ambrosioides	Mexican tea
Daucus carota	wild carrot
Foeniculum vulgare	fennel
Galium aparine	cleavers
Lathyrus latifolius	everlasting pea
Linum bienne	
Lotus suaveolens	hairy birdsfoot trefoil

Malva sp.	mallow
Mentha pulegium	penny royal
Oenothera stricta	evening primrose
Plantago lanceolata	narrow-leaved plantain
Plantago major	broad-leaved plantain
Portulaca oleracea	wild portulaca
Rumex acetosella	sheep's sorrel
Silene gallica	catchfly
Sisymbrium officinale	wild mustard
Solanum nigrum	black nightshade
Stellaria media	chickweed
Trifolium arvense	haresfoot trefoil
Trifolium pratense	red clover
Trifolium repens	white clover
Trifolium subterraneum	subterranean clover
Verbascum thaspis	woolly mullein