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ARCHAEOLOGICAL EXCAVATION OF SITE Q10/83, SOUTH KAIPARA

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The construction of an access road for a proposed house on a ridge at Twin Springs to the west of SH 16 south of Helensville resulted in the destruction of archaeological site Q10/83 (Figure 1). The New Zealand Historic Places Trust granted an Authority to Modify the site (2000/9), subject to an archaeological investigation. This was carried out by the author, four other archaeologists and two members of the local tangata whenua.

The site is situated on the Hiore Kata block. The history of this block since about 1700 has been well documented (Foster 2002, Spring-Rice 1996). Hiore Kata was a land of rolling ridges and slopes with wide valleys separating the ridges. The fertile soil of the ridges was famed for its kumara, while the swamp lands produced raupo, harakeke, ti, tuna and swamp birds.

A total of 23 archaeological sites have been recorded in the Hiore Kata block, including groups of pits, terraces and gardens. The two garden sites recorded have shallow drains running down north facing slopes. The number of storage pits in the area indicates that there would have been many more gardens than those that are known today.

The Site

The visible evidence of Q10/83 consisted of three pits and a possible terrace located on a steep sided ridge on farmland just to the east of the Woodhill forest (Figure 2). Preliminary machine investigation determined that the possible terrace was a natural feature with no archaeological evidence present. A fourth pit whose presence was indicated on an early aerial photograph was also located during this phase of the investigation.

Figure 3 shows the ridge top and the areas excavated. The possible terrace and Pit A were excavated by machine. All other excavation was carried out by hand.The natural stratigraphy of the area was consolidated Red Hill subsoil and sandstone underlying a pastoral soil that had developed over it.

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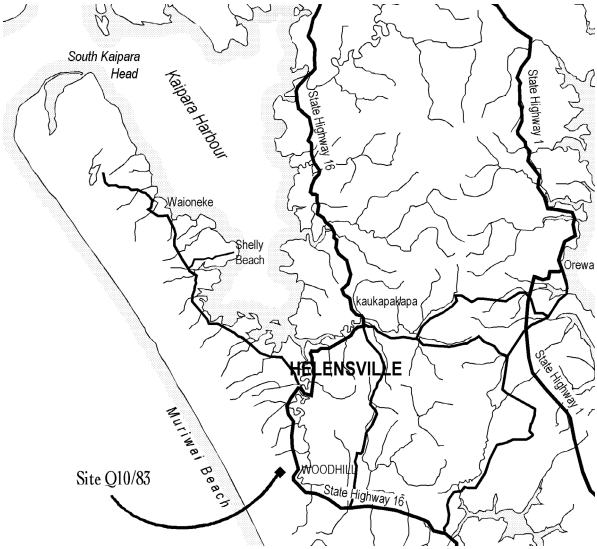

Figure 1. Location of site Q10/83

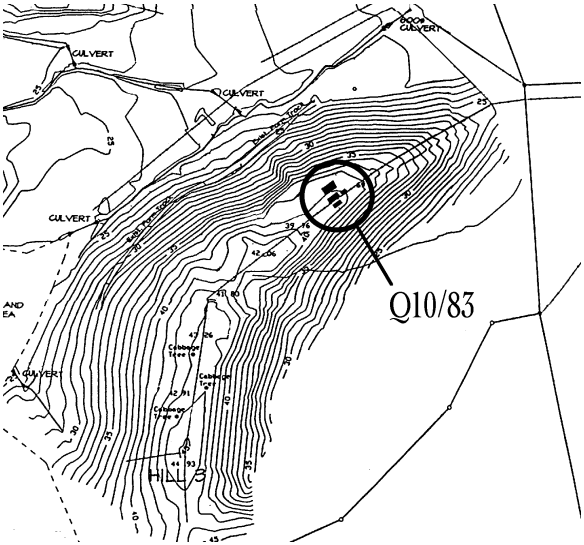

Figure 2. Contour plan of ridge and site Q10/83

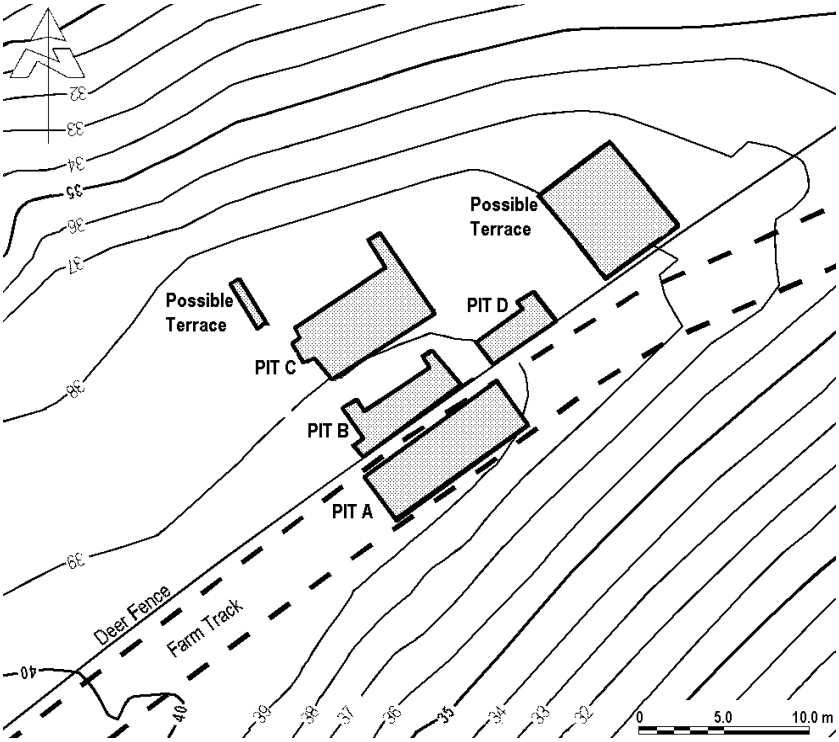

Figure 3. Q10/83: Plan showing all areas excavated

Semi-subterranean pits were the only features discovered at this site and excavation concentrated on exposing details of their construction. Figure 4 shows plans of each pit and Figure 5 cross sections of pits C and D.

Pit A

This pit was under the farm track and was investigated by machine. At the time of excavation its depth was 370 mm, although it would have originally been slightly deeper, before the track was cut over the top. It measured 5.95 m long and 1.96 m wide. An internal drain ran around the edge of the pit floor, some 120 mm wide and up to 60 mm deep. This drain ran into a sump at the north-eastern corner which measured 630 x 460 mm and was 300 mm deep. There was no sign of any external drain leading away from the sump. Only two postholes were present in the pit floor. One measured 250 mm in diamter and 210 mm deep, the other 290 mm in diameter and 360 mm deep.

Pit B

This pit measured 4.56 m long and 1.82 m wide with a depth of 0.54 m. A peripheral V-shaped drain, 120 mm wide and up to 80 mm deep was present in the floor although it was not continuous, having a gap on the eastern side which coincided with a high point in the floor.

Sumps were present in both the north-western and south-western corners. That in the north-western corner was bell shaped and 300 mm in diameter and 600 mm deep. The south-western sump was straight sided, 280 mm wide and 450 mm deep. Three postholes were present in the floor along the centreline of the pit. However, two at the northern end were very close together, one being set in the end drain and the other next to it. It is unlikely that the two postholes at this end of the pit were dug at the same time and their arrangement suggests the replacement of the post at this end of the pit during its useful life. The posthole in the drain was 190 mm in diameter and 500 mm deep while the adjacent posthole measured 210 mm in diameter and 440 mm deep. The third post hole at the southern end was 250 mm in diameter and 500 mm deep. The fill of the pit was a mixed soil containing lumps of subsoil, sandstone and charcoal, indicating that it had been deliberately filled shortly after it fell out of use. A single valve of a pipi (*Paphies australis*) was found near the top of the fill material. The fill material could well have been spoil from the digging of another subsequent pit.

Pit C

This was the largest and most complex of the pits at this site. It measured 5.96 m long and 3.10 m wide. It was also the deepest pit, 1.03 m deep. The floor, which was cut into hard, consolidated sandstone, was very uneven and sloped down at an angle of 5º to the north-west. As with the other pits on the site it had a peripheral drain in the floor. This drain, however, was more substantial. In cross section it was an open, flat bottomed U-shape, averaging between 150 and 250 mm in width at the top and 100 mm at the base. The drains were relatively shallow at the southern end of the pit (100 mm), deepening to 180 mm at the northern end. A large sump was dug into the north-eastern corner, 800 x 440 mm in plan and 650 mm deep. In the north-western corner a tunnel was cut through the bottom corner of the pit to meet a deep external open drain that ran to the edge of the ridge.

Five pairs of postholes along the longitudinal axis of the pit would have held posts to support the roof. These postholes ranged in size from 220 to 400 mm in diameter and between 720 and 890 mm in depth.

In addition to these main postholes there were a number of slots and smaller postholes cut into and around the drain on the northern and eastern sides of the drain. They do not appear to have any direct structural function in relation to the pit construction but may well represent a structure built within it.

A final feature of interest in this pit is the very eroded buttress in the centre of the northern wall. Buttresses are relatively common features in semi-subterranean storage pits and in the case of this pit it would have functioned as an entry step.

Unlike the other pits at this site there is no indication that this pit was deliberately filled. Indeed the pit was visible to almost its full depth before excavation. The sides of the pit were extremely eroded and difficult to identify which suggests that they have suffered from considerable erosion since it was abandoned. The make up of the fill material was also consistent with being largely derived from erosion of the pit sides, with a top soil forming over the collapsed sides. The only sign of deliberate filling was the external drain that appeared to have been filled in relatively recently, probably by a farmer, as a steep sided trench over a metre deep across the edge of the ridge could be a danger to stock.

Pit D

This was the smallest pit excavated, measuring 3.0 x 1.2 m. It was 0.60 m deep. Its U-shaped peripheral drain varied in width from 70 to 120 mm and it was between 60 and 90 mm deep. No sump was found in the portion excavated.

Three postholes lay along its long axis. The two more northerly postholes also contained the empty moulds of posts. The most northern posthole was 240 mm in diameter and 420 mm deep and contained a mould 150 mm in diameter. The central posthole was 210 mm in diameter and 380 mm deep with a mould of 130 mm diameter. The southernmost posthole was 200 mm in diameter and 350 mm deep.

This pit, unlike pit C, had been deliberately filled. There was also evidence of use of the pit after its abandonment. Evidence of one fire was noted on the floor of the pit in the south-west corner, where the base of the pit and drain were burnt and there was a mass of charcoal above the burning. After this fire the pit was filled and further small fires used on the surface of the fill, the largest being 400 mm in diameter and 80 mm deep.

The empty post moulds suggest that after this pit was abandoned for its original use the wooden posts holding the roof were removed for some other purpose

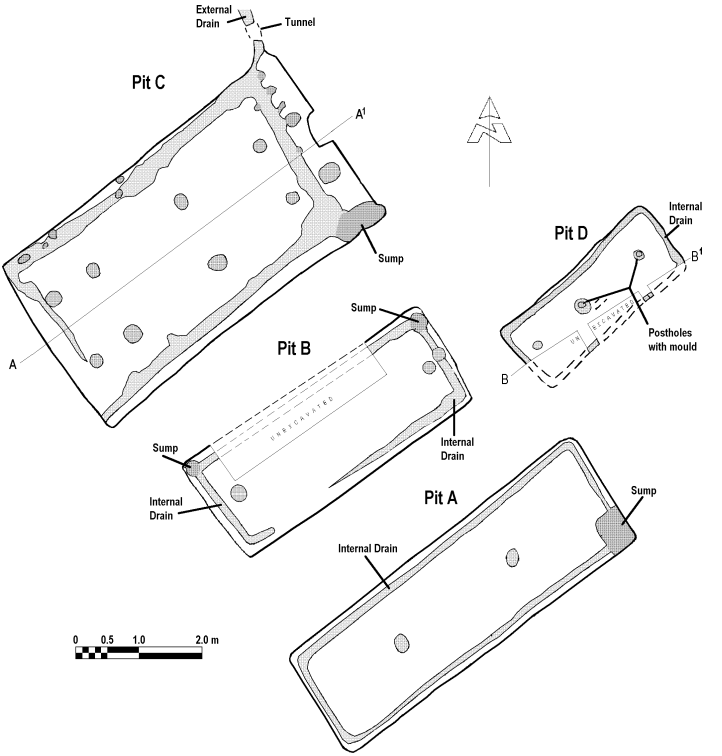

Figure 4. Plans of pits A–D at Site Q10/83

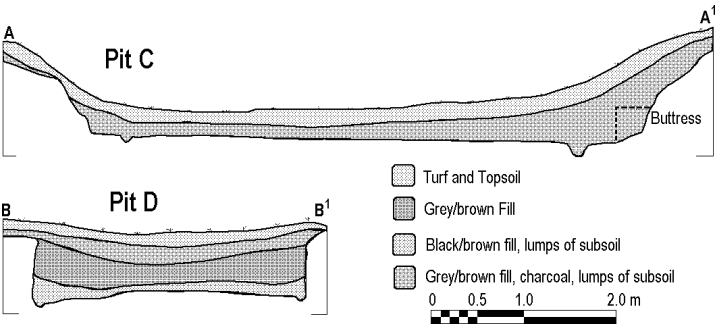

Figure 5. Longitudinal cross sections of pits C and D

before the pit was filled. Subsequently, the hollow that formed when the fill compacted was used as a sheltered place to build small fires. This practice is common at other sites investigated in the Auckland Region where there is evidence of deliberate filling of the pit after its original function ceased.

Material culture

Only one artefact was found at this site (Figure 6), in the fill of pit D. This was a chert core. Weathered cortex shows that it was originally part of a larger water-rolled rock. The reduction sequence shows that the original rock was broken into pieces then this part was further reduced. Major flakes were removed using a flat fracture surface to reduce the core further. It is likely that these struck flakes would have been used for small flake tools in themselves. However, examination of the core suggests that the primary purpose of the flaking was to produce a specific core tool as there are a number of 'trimming' flakes struck from different directions. These flakes would have been too small to make useful tools. Rather it appears that the additional flaking was intended to produce a tool similar to a 'disc core'. Such an implement would have been used as a cutting tool. However, a flaw in the stone, evidenced by the area of shattering visible in the centre of the tool, prohibited further flake reduction as no more flakes could be struck without shattering the entire stone.

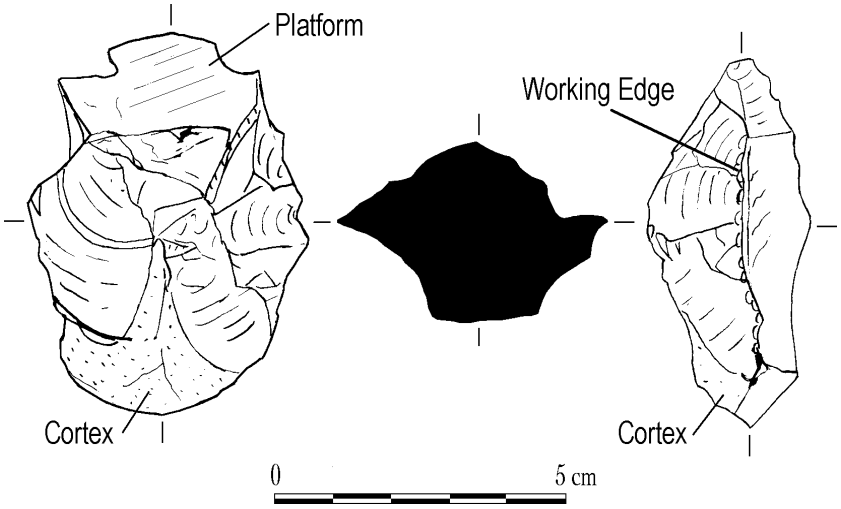

Figure 6. Q10/83: chert tool, front, cross-section and side view

Despite the apparent failure to complete the intended implement, there is evidence that the core was indeed used. One edge shows evidence of micro-flaking. This is caused by pressure against the sharp edge during use. Examination of this working edge under a microscope also shows a degree of polish. This would be caused by the edge being used to cut a material high in silica, such as flax. The degree of use is quite light, suggesting that the tool was discarded after only a short period of use which could explain why it ended up in the fill of pit D, which was also the only pit to show clear evidence of use after it was filled.

Environmental Evidence

The commonest type of environmental evidence that is recovered from New Zealand sites is charcoal, identification of which can be used as an aid to reconstruct the local environment at the time the site was occupied. Charcoal was recovered from all four pits at this site. While some charcoal came from the small fires in Pit D, and some came from the generally mixed fill of the pits, the greatest amounts of charcoal were found on the floors or in the fill of the drains of the pits.

Charcoal samples were analysed by Dr Rhys Gardiner (Auckland Museum). The greatest part of the samples showed a succession vegetation consisting of dicotyledon flowering plant tree/shrub species such as Matipo (*Pittosporum tenufolium*) and Coprosma (*Coprosma* sp.) as well as smaller quantities of manuka (*Leptospurmum scoparium*)/kanuka (*Kunzia ericoides*) and bracken (fern) root (*Pteridium aquilinum* var. *esculentum*). Table 1 lists the species identified and the sources from which they came.

Table 1. Q10/83, charcoal identification

Name	Sample sources
Matipo (*Pittosporum tenufolium*)	Pit B, fill Pit C, sump, floor Pit D, floor
Coprosma (*Coprosma* sp.)	Pit B, fill Pit C, floor Pit D, floor
Manuka (*Leptospurmum scoparium*)/kanuka (*Kunzia ericoides*)	Pit B, fill Pit C, sump, floor Pit D, fire
Fern root (*Pteridium aquilinum* var. *esculentum*)	Pit B, fill, floor Pit D, fire, floor

Other Archaeological Evidence

After the excavation was completed a visit was made to the site during earthworks undertaken for the new driveway up the ridge to see if other archaeological evidence associated with the excavated site might have been disturbed. No archaeological evidence was seen in the immediate vicinity of the excavation but a single pit was noted approximately 100 m further up the ridge. Details of the pit were not able to be recorded but it appeared to be of similar size to pits A and B, and presumably of similar construction and function.

Dating

Dating of this site is uncertain. No sufficient quantities of identifiable material was present to allow a reliable radiocarbon age estimate to be made. However, it can be hypothesised as to when the site was in use. Most significant is the evidence of the charcoal. It represents a succession vegetation, with no evidence of forest vegetation. At most archaeological sites in this region dating from before the end of the 18th century there appears to be evidence of wood from forest trees being used. The lack of such evidence at this site points to a relatively late date for its occupation. The one pit where there was no deliberate filling had particularly weathered sides, indicating that it was left open after the site was abandoned. Given the fertile nature of the kumara soils of the area it would seem likely that this area would only have been abandoned completely and the large pit C is likely to date from the 19th century occupation of Hiore Kata.

Discussion

Semi-subterranean storage pits are conventionally thought of as being for the storage of kumara (*Ipomea batatas*) alone. However, in his study of pit structures in the Kawerau area of the Bay of Plenty, Lawlor (1983: 239) lists a variety of purposes for which pits were used for

> food (kuumara, taro, aruhe and European potato) and water storage; as rubbish receptacles; to facilitate the fermentation of foodstuffs (hiinau and European maize); for rat (kiore) catching; for the temporary storage of food and material goods; as dwellings; as repositories for sacred objects; and as a place for the practice of 'witchcraft.'

At this site food storage is seen as the major or even only function of the site. No evidence was present to indicate that it was a living site with houses or other domestic features, nor was there any evidence to suggest it was used for any of the non-food storage activities listed by Lawlor. Sites like this, consisting only of pits, are not uncommon and are often found close to living sites, e.g., R11/

1930, a similar storage site on the Pukaki Creek on the Manukau Harbour, where there was a discrete storage site just outside the margins of a larger settlement area (Foster 2000). A wide variety of site types was present in the Hiore Kata area, with at least one occupation site situated on the ridge immediately to the north of Q10/83. An area of garden soil has also been recorded (Spring Rice personal communication 2001) on the north facing slope of the ridge immediately to the west. The site should not be seen as an isolated feature but as part of a wider occupation area that contains a number of inter-related sites or site complexes that together form the infrastructure of the local society.

Over 2000 pits have been recorded on the Kaipara peninsula with a very high correlation between pit location and Red Hill soils (Spring-Rice 1996: 200). These soils are especially good for growing kumara and Hiore Kata was known particularly for the quality of its crop and seed kumara from there was highly sought after. Both these factors suggest that kumara was most likely to be the crop stored at the site.

Charcoal from fern root was identified from the floor of two pits (B and D) and amongst the charcoal of the fires in the fill of pit D. Fern root was widely consumed in pre-European New Zealand. It grew wild on cleared land and former gardens. It was generally harvested in spring and early summer, and when dried could be stored almost indefinitely (Davidson 1984: 128). Although it could be stored almost anywhere it could well have been stored in pits. The presence of fern root charcoal on the floors of two of these pits could indicate that they had, at one time at least, been used to store fern root.

Semi-subterranean pits such as those found at this site are an indigenous development in New Zealand as a response to the need to store foodstuffs over winter, with radiocarbon dated examples as far back as the 12th century (Davidson 1984: 123). Davidson described their local invention as "an inspired response to inclement weather" as they provide protection from extremes of temperature and from the changes in humidity that go along with New Zealand's rainy weather. These pits would originally have been roofed, generally with A framed roofs. Many pits were lined with punga planks both to keep moisture and rats away. Elsdon Best (1916: 78) recorded that wheki (*Dicksonia fibrosa*) was a favoured material for lining pits as it was impervious to rats. In other cases pits were lined with flax matting to keep the contents away from the sides and floor (Best 1916: 90). Other materials known to have been used for lining the floor's of pits were mingimingi (*Coprosma acerosa*) and bracken fern fronds. However, no evidence was found to indicate what sort of lining might have been used at this site.

All four pits here have either a single or double row of posts to support the roof. The roof structure would have been formed from slabs of timber or tree fern, thatched with toetoe leaves or manuka bark and often with a final covering of earth (Lawlor 1983: 237).

In order to keep stored crops dry it was necessary to provide good drainage for pits, unless the soil into which they were dug was particularly porous. All these pits were drained, with at least three[1] using sumps to aid the drainage. The largest pit (C) differed from the others in that, as well as a sump, a tunnel was also cut from the drain in the north-western corner to a deep external drain that had been cut from the surface outside the pit. Such tunnels through the wall of a pit to an open drain occur elsewhere. For example, pits with a similar tunnel/open external drainage method have been excavated at Papāhīnu (Foster and Sewell 1995) and at Pukaki (Foster 2000). At the latter site a 0.5 m long tunnel from a sump led into an external drain that was nearly 20 m long and up to 1.4 m deep, demonstrating the effort the builders were prepared to use to make sure their drainage was effective.

The dimensions and internal features of these pits varied from one to another. This is a common finding at sites where there are a number of pits. Little is known of the reasons for the greatly varying sizes or the varying internal layout of drains[2], postholes and numbers of postholes, and the evidence of the arrangement of any internal furniture (i.e., racks, bins, etc). Such differences may have derived from particular requirements that are now unknown, or possibly were just the result of individual differences of the constructors who were less interested in conformity than seems to be expected now.

In a recent paper Law (2000) has suggested that large and particularly long or fine pits served a social function as well as providing for storage. Wealth displays, including displays of abundant quantities of food, were part of Maori social interaction. Law suggests that part of the display process included storage pits designed to demonstrate wealth. The largest of the pits here, C, is not particularly large as storage pits go, but it is larger than the other pits at the site and is

[1]Although it is likely that pit D had a sump in the south-eastern corner as the drains deepened in that direction.

[2]Although there is in fact less variation at this site than at others. For example, at R11/1930 (Foster 2000) there were pits whose drains were peripheral, peripheral and diagonal, single drain on one side and end, double on one side and end, s-shaped from corner to corner through the centre of the pit, or no drains at all.

certainly more complicated in its structure and a great deal of effort was expended on its construction. It could well have served to display the wealth of the owner. Inside the pits kumara intended for storage would be laid gently into piles on the soft floor covering, stored in specially constructed bins or placed on racks. Pit C has a number of smaller postholes on its north-western side that are likely to represent such a rack or racks where prized kumara, possibly the sought after Hiore Kata seed kumara, were stored in a special pit.

Three of the pits were deliberately filled during the occupation of the site. Pits are thought to have been susceptible to infection by spores of fungi which would attack any stored kumara with disastrous effects for the community relying on the crop, although a life span of up to 70 years has been suggested before a pit would become unusable (Davidson 1984: 127). Pits could also be replaced if no longer adequate for the owner's needs, or they became so decrepit that it was easier to build a new pit than repair a worn out one. Whatever the reason, the use of this site continued after the filling of the three smallest pits, as is evidenced by the fires in the fill of pit D. That pit C was never back filled indicates that it continued in use after the closure of the other pits. Indeed, it may have served as a replacement for the other inadequate or useless pits. One could imagine people building a small fire in the sunken fill of an abandoned pit while at the site to care for the precious kumara stored in the single remaining larger pit C.[3] Similarly, the chert core tool, which appears to have been used for cutting or scraping flax, could well have been discarded during the preparation of flax matting or baskets being prepared for use in the large storage pit.

No shell midden was present at this site although a single valve of a pipi shell was found at the top of in the fill of pit B. Shell midden appears to have been absent from all the known sites at Hiore Kata. Spring-Rice (1996) hypothesised that the famed seed kumara of Hiore Kata could well have been traded for seafood.

The picture that is built up of this site is one where the site is occupied over a number of years, necessitating the replacement of the pits at least once. The occupation lasted into the 19th century when a particularly well constructed pit was used, possibly for the display of prized seed kumara. The pits were in an

[3]Once kumara was stored it needed regular attention. The crop had to be inspected to discard any rotting roots and in dry weather the door would be removed during the day to allow any moisture or condensation that had accumulated to evaporate (Best 1916: 106).

area where there were gardens for growing kumara and also in close proximity to a kainga. Areas such as this, where a significant proportion of the pre-European archaeological landscape still survives, are increasingly rare in the Auckland Region. The opportunity to investigate part of such a settlement complex provides a small but useful insight into the Maori settlement of the area in the 18th and early 19th centuries.

Acknowledgements

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