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AN ARCHAEOLOGICAL INVESTIGATION IN KAMO, NORTHLAND – EVIDENCE FOR EARLY SETTLEMENT AND LAND CLEARANCE

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Introduction

This paper presents the results of an archaeological investigation of Māori site Q06/616 located in Kamo, just north of Whangārei. The site was recorded during archaeological monitoring of construction works for the State Highway 1 Kamo Bypass Stage 2, which was located predominantly in a residential area, including part of a golf course, to the southeast of Kamo township (Figure 1). The works were monitored under NZHPT Authority 2011/52 and the full archaeological report has been completed by Clough & Associates Ltd (see Phear & Shakles 2011).

Site Q06/616 was located on the western boundary of the landscaped grounds of the Mount Denby Golf Course, beneath the carefully maintained fairway turf. Prior to being a golf course, the landscape had been farmland with 19th century plans indicating the presence of a swamp to the east of the site, next to and incorporating Otangarei stream. Other evidence of Māori occupation in the nearby area was recorded by J. Maingay as part of the Kamo Bypass Stage 1 development (Maingay 1990), with midden, pits and terraces being recorded. While some sites were destroyed during the Stage 1 works, several of the sites survive, including site Q06/616 which is now located underneath the Stage 2 Bypass.

Analysis of samples collected during the Stage 2 Bypass investigation include pollen, phytolith and charcoal identification, and two radiocarbon determinations were obtained. While the archaeological remains that were exposed can be considered limited, they are potentially significant in relation to early Māori settlement and land clearance in the Kamo area in the 13th century.

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Figure 1. Location of Kamo and Q06/616, north of Whangārei.

Archaeological background

Previous archaeological survey

The first extensive survey of the area was undertaken by G. Nevin in 1988. Nevin's report identified a number of archaeological sites in the immediate vicinity of the Kamo Bypass Stage 2 development which were interpreted as being pre-contact Māori in origin. These sites were later recorded by J. Maingay and added to the NZAA Site Recording Scheme during the initial planning process of the Stage 1 Bypass (Maingay 1990).

Opus International Consultants commissioned a second survey to locate the archaeological sites on the line of the chosen route for Stage 1 (Nevin 1999). This survey indicated the presence of five sites in the development area – Q06/486, 487, 488, 489 (originally recorded by Maingay in 1990; see Figure 2 and Table 1) and Q06/501 (Nevin 1999). The sites predominantly relate to Māori settlement and are located close to Otangarei stream.

Three of the sites were located close to the Kamo Bypass Stage 2 project area – Q06/487, 488 and 489. Of the remaining two sites, Q06/486 was completely destroyed by the Stage 1 works (Johnson 2002) and Q06/501 is located outside the development area. The Stage 1 Bypass works were monitored and investigated by Northern Archaeological Research (Johnson 2002).

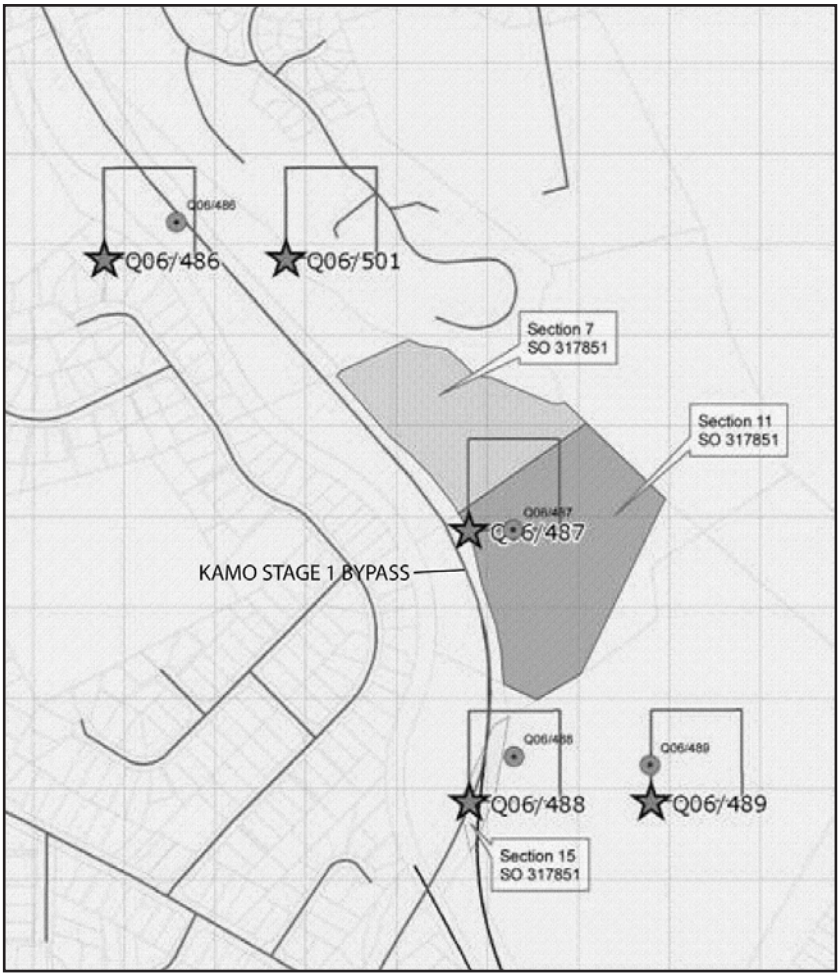

Figure 2. Sites originally recorded in the area of the bypass.

Site Q06/487 consisted of four pits, midden and terraces which are considered to pre-date European settlement, as well as a knoll, depression, and stone wall which are considered to be of early European origin.

Site Q06/488 was described as two small flat-topped knolls lying c.35 m apart, with some ill-defined terraces on the north and northeast slopes of the northern knoll which might have been living terraces.

Site Q06/489 consisted of two stone and earth mounds near the edge of a natural scarp that had undergone some alteration/disturbance. As the

land was purchased and used for farming, it was considered likely that some archaeological features, especially stone features, had been destroyed during land clearance and ploughing activities.

Table 1. List of archaeological sites previously recorded in the general area (source: NZAA ArchSite).

NZAA Site #	Easting	Northing	Site Type
Q06/486	1718278	6050184	Pit/terrace
Q06/487	1718678	6049885	Midden, oven, pits terraces
			19th century stone wall
Q06/488	1718679	6049585	Pit/terrace
Q06/489	1718879	6049586	Stone mound/ horticulture
Q06/501	1718478	6050185	Pit/terrace

The survey for Kamo Bypass Stage 2 was carried out in 2010 (see Phear & Clough, June and November 2010). It was determined that sites Q06/487 and 489 would not be affected by the development, but that the western part of pit/terrace site Q06/488 fell within the area of proposed works, although it was not known whether any features would be affected.

These surveys, and one undertaken by Geometria for the proposed Spedding Road extension in Kamo (Carpenter 2010), also identified European stone walls in the project area that were recorded as sites Q06/581, Q06/582 and Q06/607, all of which would be affected to varying degrees by the Kamo Bypass Stage 2 works. The results of investigation of the walls are not discussed here (see Phear & Shakles 2011).

Archaeological monitoring of Kamo Bypass Stage 1

As stated above, site Q06/486 was destroyed by the construction of the Northern Kamo Bypass Stage 1 and both surface and sub-surface archaeological features of site Q06/487 were either modified or destroyed.

The investigation revealed numerous features relating to prehistoric and historic Māori occupation and cultivation of the area. The most common features were hāngī/earth ovens and associated fire scoops for heating the oven stones. Other features included stone mounds, remnant ditches/drains, frequent patches of burnt ground and three middens from the eastern side of site Q06/487. An obsidian flake and cobble were also recovered from this site (Johnson 2002). Johnson interpreted the areas of burning as resulting from the initial burn-off

of primary podocarp forest and garden clearance and ongoing maintenance to replenish soil fertility (Johnson 2002: 35-38). These features were most likely produced as a result of food preparation activities by individuals or families when working the garden sites (Johnson 2002).

Two radiocarbon dates from shell midden samples collected from Q06/487 were obtained, producing dates in the range of 1480-1590 AD (at 1σ), and the other 1500-1620 AD (at 1σ; Johnson 2002: 26).

Johnson considered that archaeological features associated with the horticultural sites would most likely occur throughout the area of fertile volcanic soils to the south and east of the present Northern Kamo bypass route (Johnson 2002: 37).

Results

Archaeological monitoring and investigation took place from 8-20 October 2010. A summary of details related to the excavated features is provided here, and the full context descriptions can be found in the excavation report (Phear & Shakles 2011). As an aid to reporting, site Q06/616 was split into three areas: southern, central and northern, and the extent of the site as exposed by stripping is illustrated in Figure 3. The majority of features were cut through context (101), a mottled mid-brown clay loam layer with frequent charcoal inclusions. This was thought to potentially be a gardening soil. No artefacts were recovered.

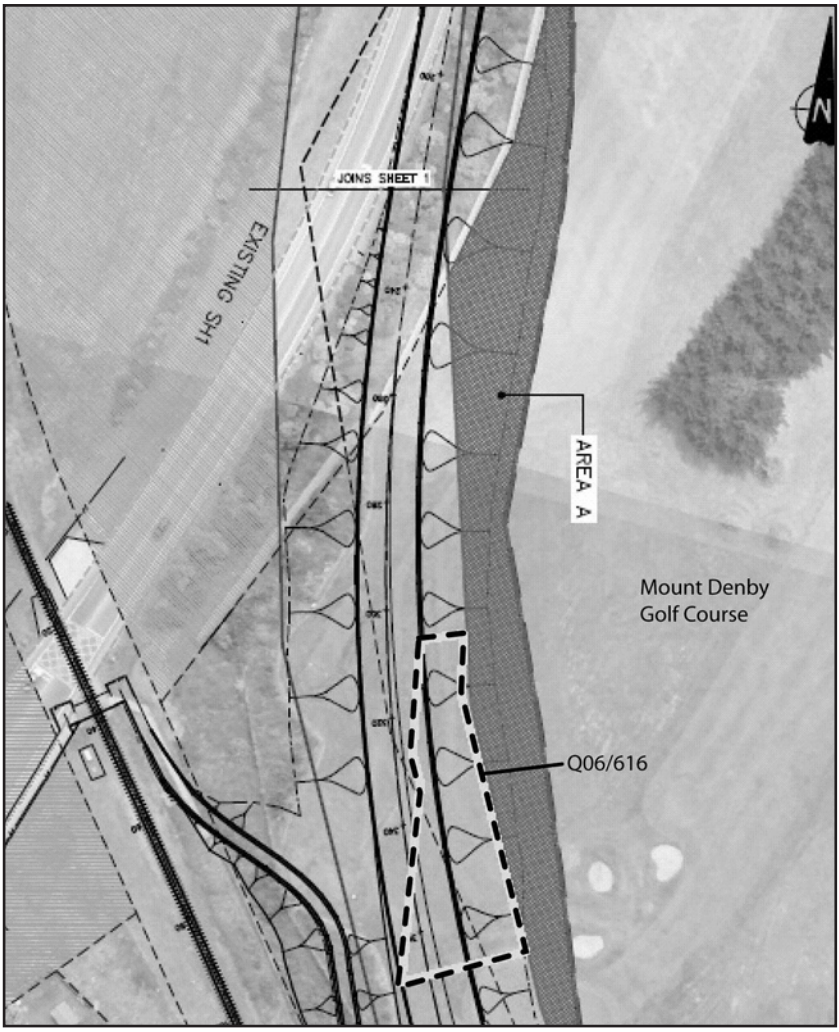

Figure 3. The dashed line defines the area where features comprising site Q06/616 were observed after the topsoil stripping.

Southern area

One firescoop (105), six hāngī (contexts 108, 110, 112, 115, 120, 122), one inferred hāngī (128) and two stake holes (124 and 126) were recorded in the southern area (Figure 4-6). The firescoop (105) contained three fills with burnt grey volcanic stones in the top fill displaying evidence of burning and deliberate placement (Figure 6). It formed the most distinctive feature on the site.

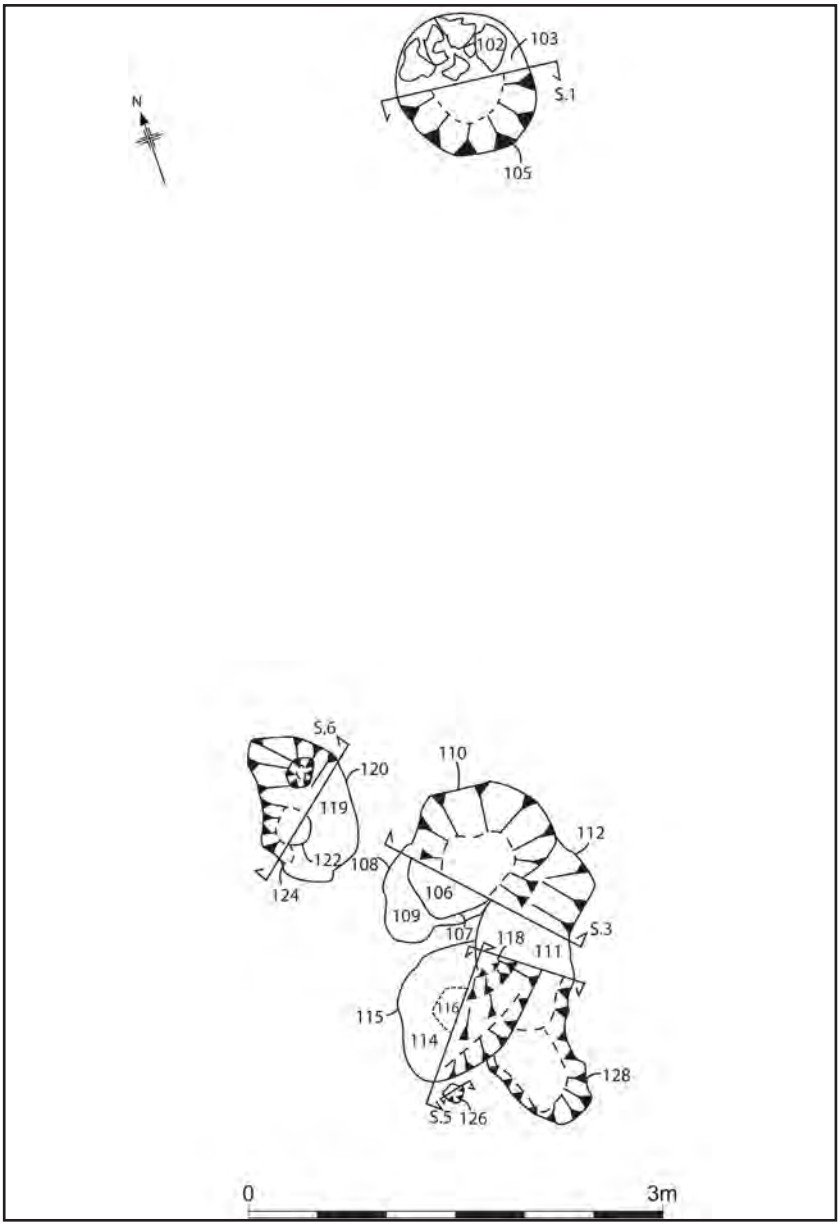

Figure 4. Plan of southern section of features of site Q06/616. Firescoop [105] (top) and the complex of intercutting features (bottom).

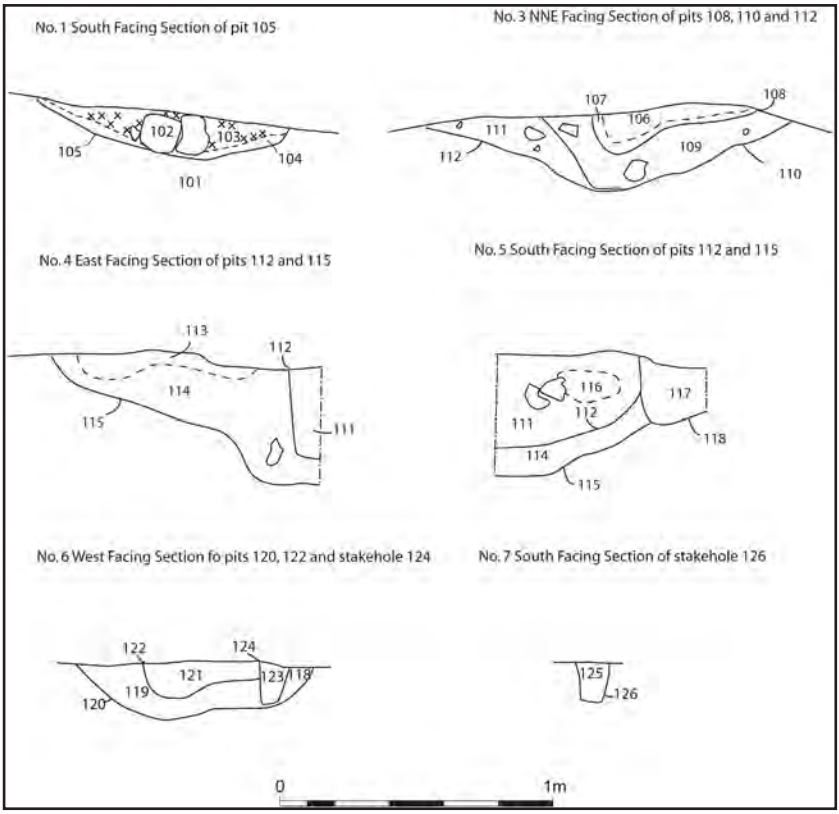

Figure 5. Section drawings of features in southern area of site Q06/616.

A group of hāngī (contexts 108, 110, 112, 115, 128) were clustered together with some intercutting, indicating a series of possible re-cuts at the same location. Hāngī (120) and (122) were located just west of the clustered group, along with two stake holes (124 & 126), and a stake hole (126) was located within a hāngī (120). The hāngī fills displayed evidence of burning to variable degrees.

One intrusive modern drainage feature (118) was recorded, which was associated with the golf course operations.

Central area

Three firescoops (contexts 130, 132 & 139), one inferred hāngī (137), one posthole (134) and two stone concentrations (140 and 141) were recorded in the central area (Figures 7 and 8).

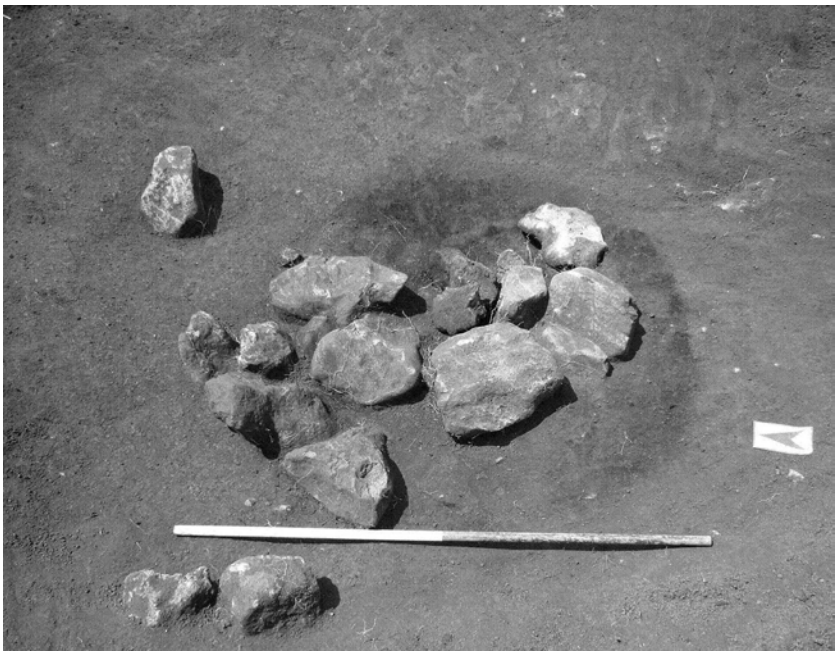

Figure 6. Pre-excavation shot of firescoop [105] taken facing east (scale: 1 m).

The three firescoops were quite shallow, only up to 140 mm deep, while the hāngī appears to have been cut deeper at 200 mm deep. All the features have undergone some truncation, however, most likely during construction of the golf course fairway. Only one posthole was recorded (134) which was located alongside a firescoop (132).

The inferred hāngī contained fire-cracked stone and charcoal in its lower fill (136). Both stone concentrations had been placed within shallow sub-oval and sub-circular pits, with only a thin layer of stones remaining.

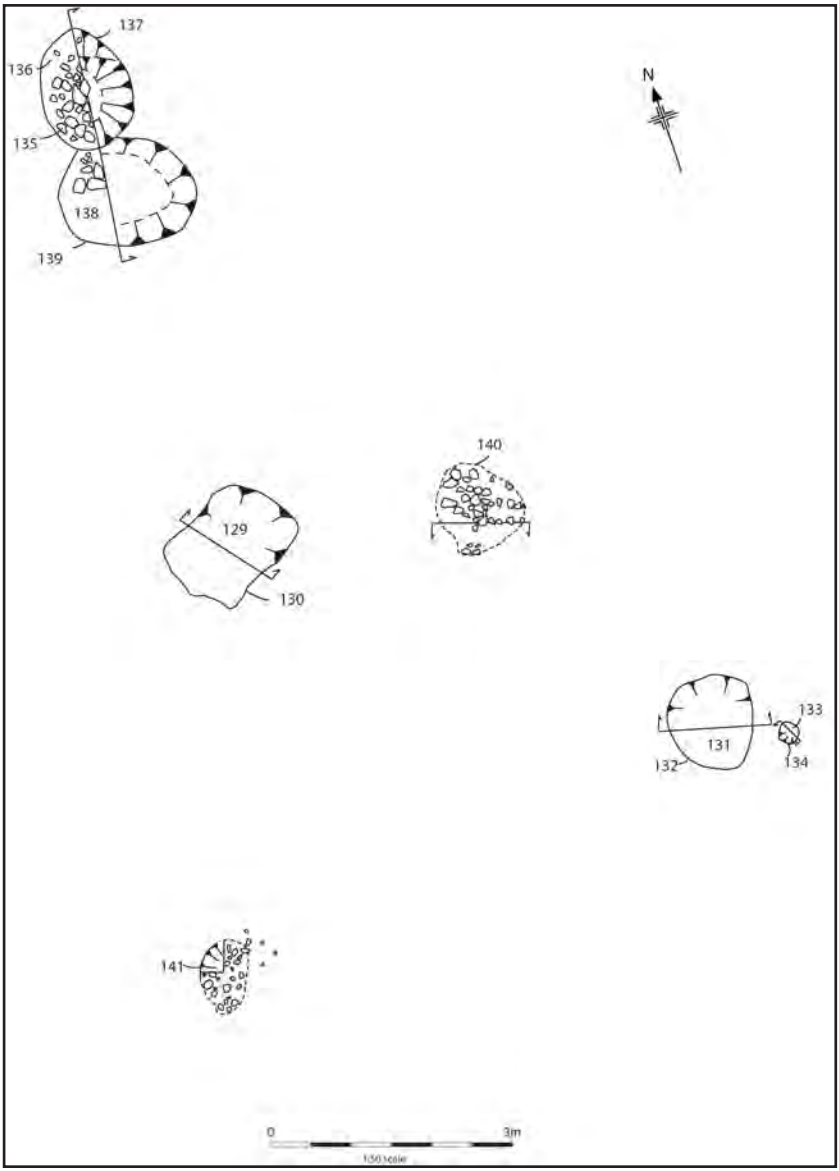

Figure 7. Plan of features located in central area of site Q06/616.

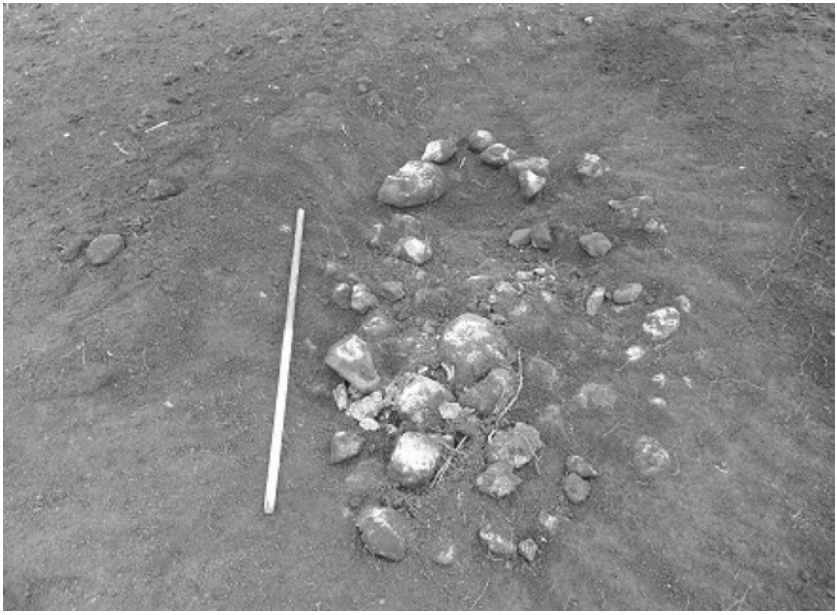

Figure 8. Stone concentration (141), taken facing south (scale: 1 m).

Northern area

The northern area was characterised by postholes, with five recorded (Figures 9 and 10). Two postholes (contexts 145 and 147) are located alongside each other and may have been placed at the same time. They both had near vertical sides, identical fills (146 and 148) and extended to a depth of 190 mm and 150 mm respectively. Posthole (149) was located to the east of these two, and had a similar form and depth.

Posthole (143) is the most southerly of the postholes and was shallow at only 6- mm deep. It has been heavily truncated most likely through landscaping activities. Posthole (151) formed the most northerly feature. It contained a similar fill (150) to postholes (145 and 147). The postholes did not form any discernable pattern.

Plant microfossil analysis

Two soil samples from site Q06/616 were collected and sent to Dr Mark Horrocks at Microfossil Research Ltd for a detailed environmental analysis. One sample from a possible garden soil (101) was analysed for phytoliths and starch only; the other sample, from the fill of a firescoop (103), was analysed for all three microfossil types (see Phear & Shakles 2011 for details on methodology).

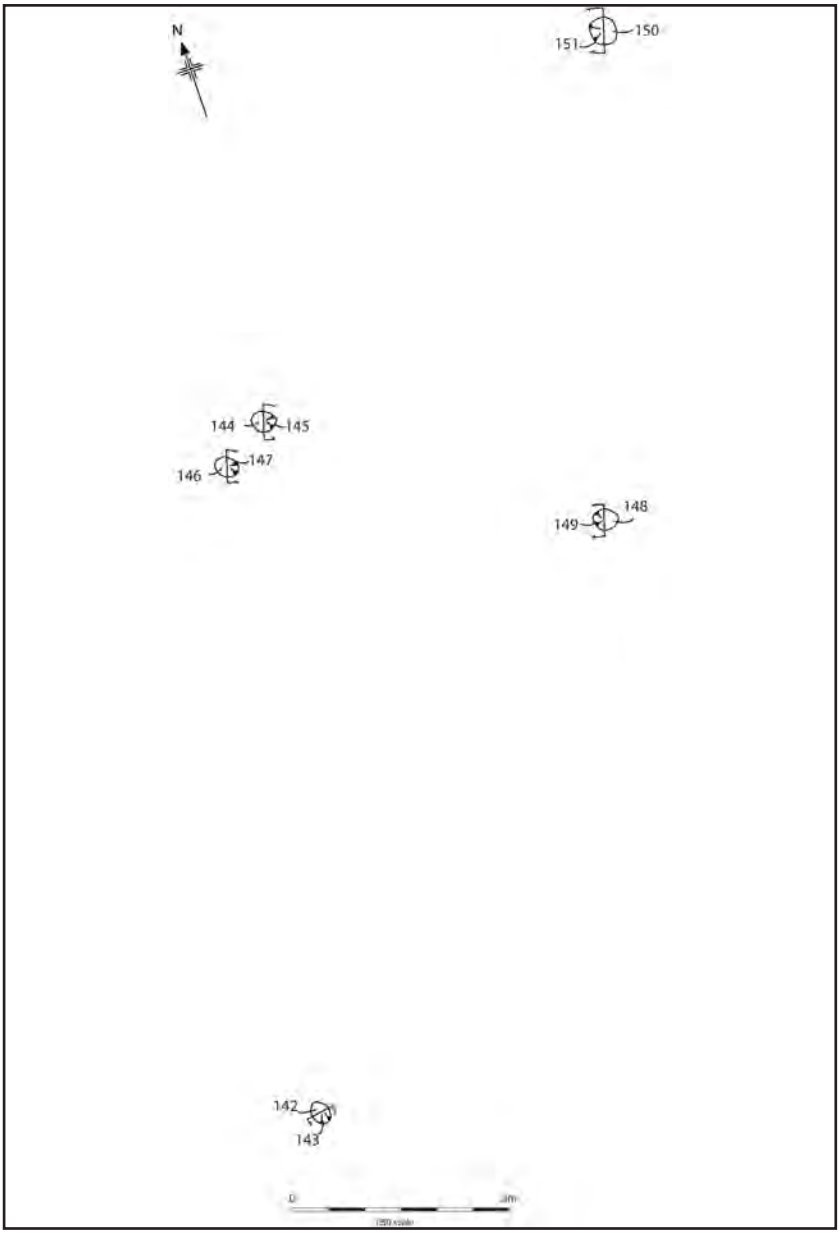

Figure 9. Plan of features located in northern area of site Q06/616.

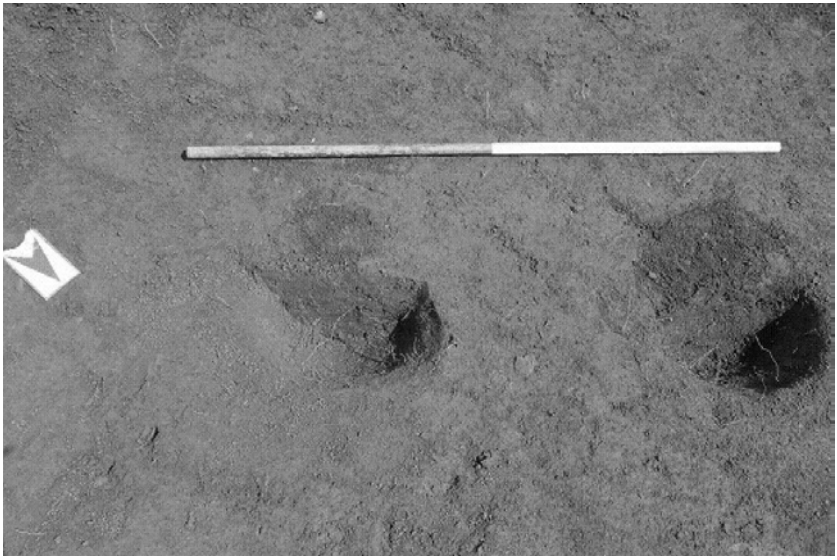

Figure 10. Post hole [145] (seen on right) and [147] (left side of shot) (scale: 1 m).

Pollen analysis results

The sample analysed for pollen (103) contains a very high concentration of microscopic fragments of charcoal, reflecting human activity around the site, namely burning of vegetation and cooking fires. The sample is dominated by spores of ferns, especially *Cyathea* tree ferns. This large amount of *Cyathea* spores suggests the use of *Cyathea* fronds (which bear the spores) at the site by local people. Bracken (*Pteridium*) and hornwort (Anthocerotales) spores also feature, an association which, combined with a paucity of tall tree pollen, indicates burning of vegetation. Bracken, an invasive ground fern with widely dispersed spores, is often abundant in New Zealand pollen spectra of the last millennium, almost always associated with large scale repeated burning of forest by early Māori. It may form dense stands, averaging 1-2 m tall, over extensive areas. Hornworts are small inconspicuous plants that colonise freshly exposed soils and are also associated with forest burning in pollen spectra of the same time span. Ferns with monolete spores also feature in the sample. Many of New Zealand's numerous fern species have this spore type, which is difficult to differentiate between genera. All are ground ferns, hwoever, with many species favouring disturbed forest environments. The pollen evidence also indicates that remnants of conifer-hardwood forest included pōhutukawa/rātā (*Metrodiseros*) and rewarewa (*Knightia*).

Phytolith analysis results

The phytolith assemblages are dominated by nīkau (*Rhopalostylus*), spherical nodular and bulliform/elongate types. Nīkau phytoliths are spherical spinulose and this type occurs only in palms (Arecaceae) and bromeliads (Bromeliaceae; Piperno 2006). New Zealand has no indigenous bromeliads and nīkau is the only species of palm. The very large amounts of nīkau phytoliths in both samples may in part reflect local activities such as weaving and thatching. Although spherical nodular phytoliths in New Zealand are known to originate from twigs and wood, little is known yet about which species of trees and shrubs produce them. Like the pollen evidence, the large amount of grass phytoliths (bulliform/elongate types) reflects vegetation disturbance.

Starch and other plant analysis results

No convincing evidence of starch and associated plant material was found in either of the the samples.

Summary

Plant microfossil analysis of samples from Q06/616 shows large scale forest clearance by early Māori. Apparent lack of starch and associated plant material in the samples most likely indicates that the sampled deposits have not been used for intensively cultivating or cooking starchy tuberous or root crops.

Charcoal analysis

Three samples were submitted to Dr Rod Wallace of the University of Auckland for charcoal identification and suitability for radiocarbon dating. The samples were from six contexts: 103 (fill of firescoop 105); 107 (fill of hāngī 108); 114 (fill of hāngī 115); 119 (fill of hāngī 120); 123 (fill of stake hole 124); and 125 (fill of stake hole 126). The results are presented in Table 3.

- *Context (103) Sample 1:* Apart from the tōwai/tāwheowheo, all the pieces appeared to be from small diameter wood and formed a suitable C14 dating sample.
- *Context (103) Sample 2:* This had an identical species composition to the first sample. A 19 gram dating sample was extracted composed of selected large chunks of charcoal that were very clearly from small, < 5 cm diameter stems and formed a suitable C14 dating sample.

None of the pieces from contexts 107, 114, 119, 123 and 125 appeared to be from small diameter wood and they were not suitable for C14 dating.

Discussion

All the charcoal is from broadleaf tree species. Though the assemblage size is too small to provide a proper palaeo-botanical analysis the material available suggests forest rather than the fern and shrub association so common in sites of this area. The absence of any conifers might suggest secondary forest regrowth, but far more samples would be needed to seriously advance that proposition.

Radiocarbon dating

Only two samples of charcoal were suitable for radiocarbon dating, both from context (103). Sample 1 was taken from the base of the deposit and consisted primarily of māhoe, with kohekohe, pūriri, pōhutukawa/rātā, hīnau/pōkākā and tōwai/tāwheowheo. All the pieces appeared to be from small diameter wood and therefore formed a suitable C14 dating sample. The sample was sent to the University of Waikato Radiocarbon Dating Laboratory.

Sample 1 produced a result of 815 ± 36 years BP (WK-30944) with a calibrated radiocarbon date range of 1229-1275 AD (at 1σ; Figure 11).

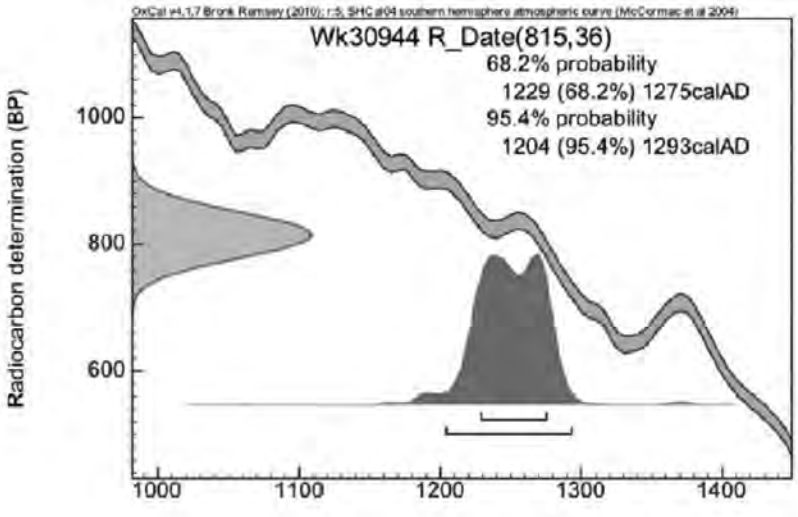

Figure 11. Radiocarbon date range for Sample 1 from context (103).

Sample 2 derived from the top of the feature and was situated approximately 50 mm below the turf line of the golf course. The sample had an identical species composition as the first sample and a selection of large chunks of charcoal, very clearly from small <50 mm diameter stems was extracted which

formed a suitable C14 dating sample. The sample was sent to the University of Waikato Radiocarbon Dating Laboratory.

Sample 2 produced a result of 371 ± 34 years BP (WK-31497), with a calibrated radiocarbon date range of 1498-1626 AD (at 1σ; Figure 13). This second date is c.200+ years younger than that produced by Sample 1. It was, however, from a less secure context near the very top of the feature and in close proximity to the surface, where contamination may have occurred from later vegetation burn-off in the area, later agricultural activities, or from extensive landscaping activities associated with the creation of the golf course.

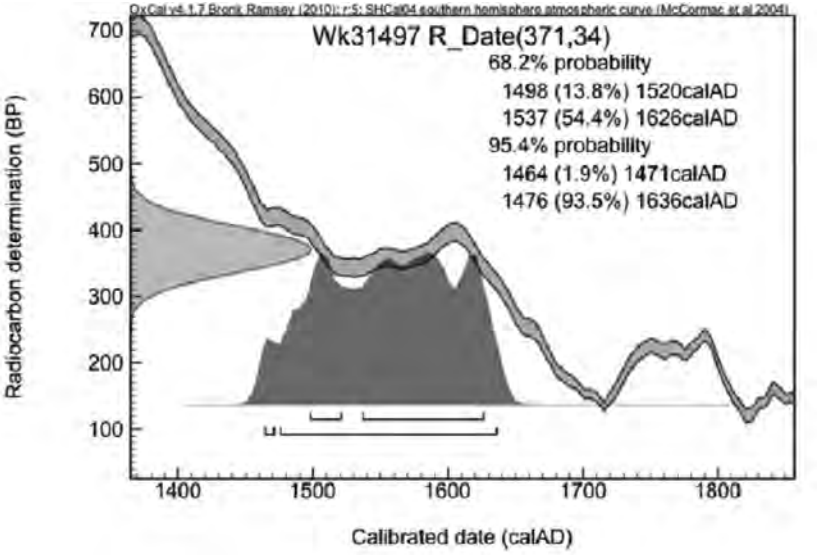

Figure 13. Radiocarbon date range for Sample 2 from context (103).

It is felt that Sample 1 offers a more accurate date for deposit (103) as it was obtained from near the base of a secure, sealed deposit within a clearly defined feature. When taken in conjunction with the plant microfossil evidence, it points to early vegetation clearance of the site by Māori.

Discussion and conclusions

Site Q06/616 consisted of a number of hāngī pits or firescoops associated with stake and post holes, and two concentrations of stones. While no artefacts were recovered from the features during excavation, soil samples were analysed for environmental evidence in the form of pollen and phytoliths, and charcoal

was examined in order to identify tree species. In addition, two radiocarbon determinations were obtained for the site.

Many of the features recorded at site Q06/616 are considered to relate to food preparation by small groups of individuals within a landscape where land clearance was evident. Land clearance was indicated by evidence of fire in the form of charcoal, and a dominance of landscape burning and secondary vegetation growth in the form of ferns, hornwort, bracken and grass phytoliths.

The picture is thus one of forest clearance to create usable land for living and/or cultivation. Charcoal identification from the hāngī pits/fire scoops provided evidence of the burning of broadleaf species with an absence of coniferous forest species, leading to the suggestion that there was secondary forest re-growth nearby (Wallace 2011). The pollen analysis, however, recorded the presence of coniferous species, although in general there was a paucity of tall tree species. It is therefore possible that only broadleaf species were selected for fuel.

The post and stake holes recorded during the excavation did not form any visible pattern. Temporary structures, however, must have been present in the area. This is supported by the evidence of nīkau at the site, which may indicate weaving or thatching close to the cooking features. Also, as tree ferns (especially Cyathea spores) dominated the pollen record (Horrocks 2011), this suggested the use of fern fronds at the site.

One significant element of the site is the radiocarbon determination which places land clearance by early Māori within the 13th century AD. While a second radiocarbon determination from the same hāngī /fire scoop returned a much younger age of around the 16th to early 17th century, this sample was not from such a secure context and may have been contaminated by more recent landscape burning (it was located close to the turf line, rather than within the feature). If reliable, the second date would indicate occupation of the site at least two centuries later.

Establishing a chronology of settlement in New Zealand based on evidence for land clearance and deforestation has been long discussed in both archaeological and ecological literature. One significant indicator for human presence is evidence for fire (see McGlone 1983). Māori used fire for a variety of reasons including clearing sites for cultivation, ensuring that living areas were free from tall vegetation, keeping tracks clear, as well as to encourage bracken growth, a plant that formed an important carbohydrate source (McGlone 1983, 1989).

A massive increase in fire frequency through microscopic charcoal fragments in lake and bog sediments takes place from the 12th century onwards, and the majority of dates fall between 1200 cal. AD and 1400 cal. AD (McGlone

& Wilmshurst 1999), with the earliest onset of permanent human settlement based on radiocarbon determinations of archaeological material suggested to be around AD 1200-1300 (Anderson 1991; Higham et al. 1999).

The pollen and phytolith record and the wood species identified for site Q06/616 provide evidence for potentially large scale forest clearance through the presence of both charcoal and secondary regrowth plant species in the 13th century. While the sample is small, the evidence does suggest land clearance at an early date at this site, which predates other sites in the immediate area.

When compared to other Māori sites in the vicinity, the archaeological features of site Q06/616 are consistent with similar archaeological remains indentified by Johnson (2002) at site Q06/487. There is, however, a distinct difference in occupation date with the radiocarbon determinations indicating much later settlement (1480-1590 AD and 1500-1620 AD at 1σ) than is suggested by sample 1 of site Q06/616. The samples were from midden located nearby, however, so it is possible that not all the features recorded by Johnson date to the same period; some may also date to an earlier settlement.

Sites of early settlement are usually located in relation to water sources. Two late 19th century plans indicate that there was a swamp in the area at this time, next to and incorporating Otangarei stream (see Figure 13). Local traditional histories of the Ngaitai hapū (of Ngāpuhi) speak of a lake in the area of the present Kamo golf course (Keri Peihopa, pers. comm.). This could well have been in close proximity to site Q06/616, and may subsequently have been infilled due to increased sedimentation as a result of forest clearance, which could explain the transformation from lake to swamp. Further testing is necessary to confirm this, however, particularly coring of the former swamp site, in order to establish its sedimentary history and indeed whether lacustrine sediments are present. Additional pollen and phytolith analysis is also required to look for deforestation indicators. Such evidence would provide a wider picture of the landscape history of this area, which, when combined with the results of the archaeological investigation, will lead to greater understanding of early Māori land use in the area.

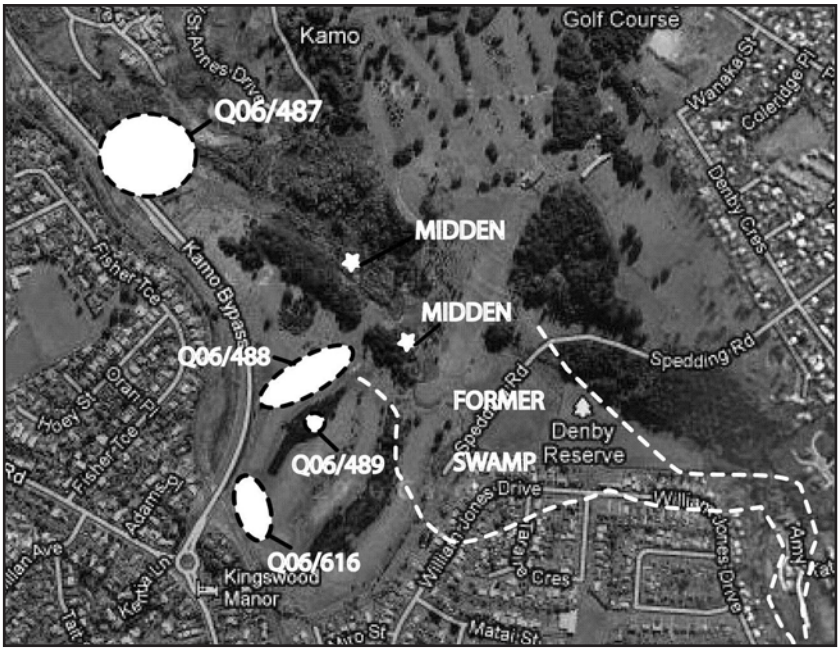

Figure 13. Aerial image of the area illustrating the rectified location of the former swamp (following Carpenter 2010); the archaeological sites in the area, and site Q06/616 identified in this project.

Acknowledgments

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