Transmission tower works at pā site Q09/993 (HNZPTA authority 2020/275): final report

report to
Heritage New Zealand Pouhere Taonga
and
Transpower New Zealand Ltd

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Transmission tower works at pā site Q09/993 (HNZPTA authority 2020/275): final report

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Transpower New Zealand Ltd have undertaken earthworks for the stablisation of transmission tower HEN–MPE–A0137, located at 3564 State Highway 16, Glorit, Kaipara (Lot 1 DP 147281 and Lot 2 DP 147281) (Figure 1). An unnamed pā is recorded in this location as archaeological site Q09/993 in the New Zealand Archaeological Association (NZAA) Site Recording Scheme (SRS) (Figure 1). Heritage New Zealand Pouhere Taonga (HNZPT) archaeological authority 2020/275 was obtained for the works as site Q09/993 was within the footprint of the works. The works exposed two midden deposits as well as a small handful of chert flakes in several find spots.

Archaeological excavation of the trenches was undertaken by Danielle Trilford, once subsoils were reached a 3 tonne hydraulic excavator completed trenching of the natural subsoils. All works were monitored by Danielle Trilford accompanied by Tūmanako Povey of Ngā Maunga Whakahii o Kaipara Development Trust, with occasional visits from Shona Oliver from the roopū. The ground disturbance associated was archaeologically monitored.

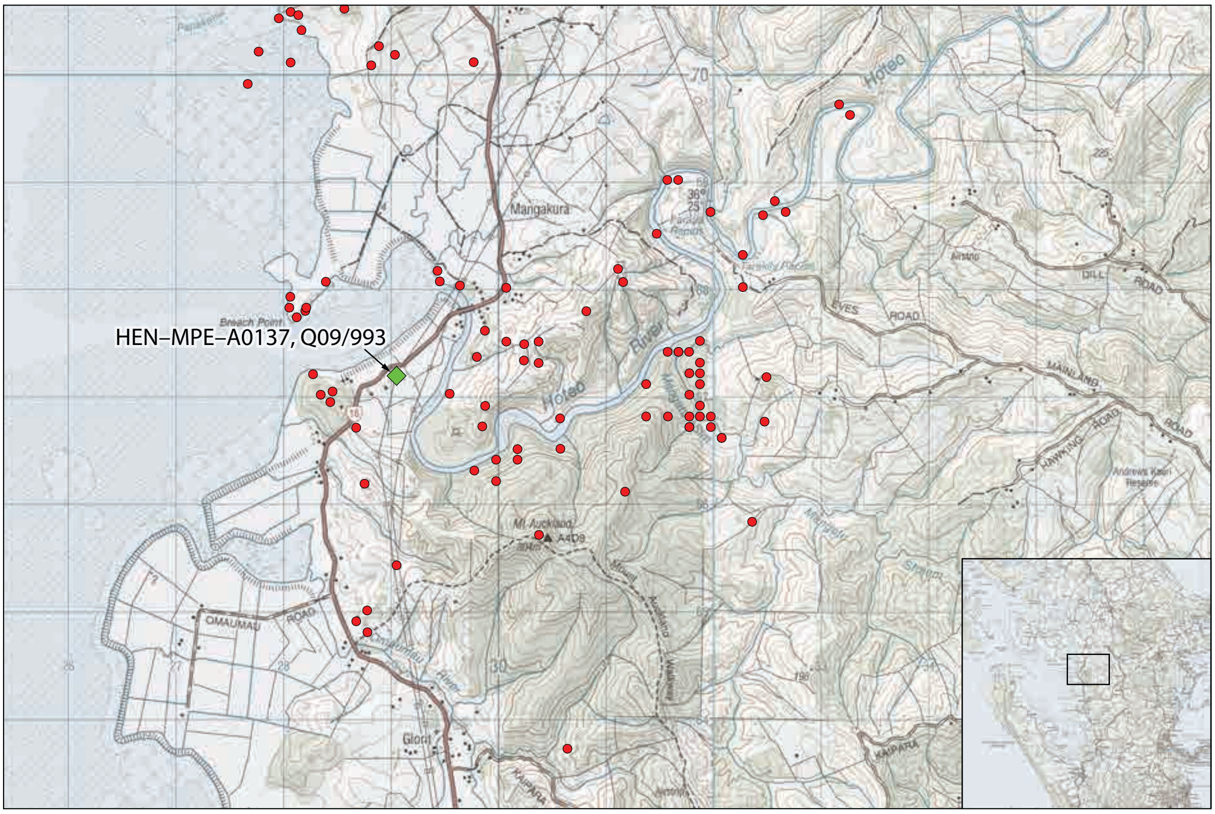

Figure 1. Location of pā Q09/993, transmission tower HEN–MPE–A0137, and recorded archaeological sites in the area.

Background

The tower where works occurred stands on a hillock surrounded by drained swampy flats overlooking the Kaipara Harbour and Hōteo River mouth. Based on soils and environmental variables, such as topography, Land Resource Information Services (LRIS, https://whenuaviz.landcareresearch.co.nz/) indicates the most likely forest canopy in the wider area was largely kauri/taraire–kohekohe–tawa forest with some kahikitea–pukatea–tawa forest.

The HEN–MPE–A transmission line was installed in 1951 (Transpower pers. comm.). Transpower have no clear documentation of the method and extent installation works of the towers in 1951 to confirm the extent of ground disturbance during the first installation. However, it is likely the tower is typical to other tower installation methods of that period. This involved hand excavation of a hole for the tower leg, and back filling. Archaeological monitoring of remedial grillage works at other Transpower towers in past seasons often exposes in situ ground surfaces, some of which have archaeological contexts present.

Historic background

The two closest portages to the site the Ōtamatea and the Weiti portage (Hooker 1997). Portages were land channels used by Māori to transport their waka to the next waterbody. The Ōtamatea portage connected Kaiwaka and Mangawhai via the Kaiwaka River. In 1841 William Colenso travelled over this route and the reported difficulty finding his way through the dense bush (Taylor 1954 quoted in Hooker 1997). The exact route is not clear but most likely follows the route of the Kaiwaka Mangawhai Road as it passed through Hakaru (Blandford and Worthington 2017). The Weiti Portage ran between Weiti and Kaukapakapa River, allowing travel between the Pacific Ocean and Tasman Sea.

Tower HEN–MPE–A0137 is near the Hōteo River Mouth. The Hōteo River and surrounding land has significance to both pre-1900 Māori and European history. The river was a key area for transport inland. There were numeorus resources available to Māori in the area, spread over land, and fresh and salt water bodies. The ease of communication and transport was also appealing, using the many freshwater bodies in the rohe. Murdoch (1994) records that the coastline on the south side of the river, near the tower, was where Ngāti Rongo maintained a settlement called Puatahi. The outline of Puatahi has been drawn in Murdoch's 1994 report and it covers the land where HEN–MPE–A0137 stands.

After the Ngāpuhi raids in the 1820s, Ngāti Rongo's largest settlement was reported to stretch between Kaupkapakapa and Puatahi, and the lower North Island iwi Ngāti Hine were permitted by Ngāti Whātua to occupy Puatahi as a gesture after their support during the conflict.

The European history of the Hōteo Catchment has mostly involved exploitation and development of the area's resources. Murdoch (1994: 5) writes that, "…it has had a changing focus overtime, and has involved a wide range of activities including: flax milling, gum digging, timber milling, the construction of transport routes, land clearance and drainage, the development of pastoral farming, and more recently exotic forestry." There is no record of those activities occurring immediately near Q09/993 but it is likely the flats below the hillock was drained and prepared for farming.

Archaeological background

There are patches along the coastline and headlands within the Kaipara Harbour with densely recorded archaeological landscapes, but overall, most of the Kaipara is poorly surveyed, researched, and recorded. The recorded pre-European Māori settlements are generally located on the fringes of the hills at the mouths of waterways emptying into the Kaipara River (Tatton 2001). There have been very few reported investigations near the site or areas further afield. While earthworks like pā and terraces occupy the record hinting at occupation in the middle and late period of human occupation, early period toki (adzes) have been collected at both Poutu and South Head peninsula to show there is a long time-depth of human occupation in the area (Irwin 1985: 23).

Between 2001 and 2010 archaeologists surveyed coastlines around Auckland to improve the archaeological record. Some coastlines near the tower were included, and pa site Q09/993, where the tower stands, was inspected from the roadside during the survey (Brassey 2010). There have not been any significant surveys or excavations recorded near the tower otherwise. The area is recognised to be of high significance archeologically (Tatton 2001).

In the 1950s Les Groube and Roger Green ran a survey of the South Kaipara Head with the Auckland University Archaeological Society (Groube and Green 1959). In this survey 14 pā were recorded and mapped, and it was observed that "…a striking feature… the use of ditch and banks and the secondary use of well-planned terracing" were common characteristics. Groube and Green also identified that the distribution of pā across the peninsula were near waterways and swamps, the site locations plus evidence of shellfish midden deposits were evidence of extensive use of watercourses for food and transport. Another 10 sites were found which were either pit complexes or middens. Around 40 years later Wynne Spring-Rice produced a PhD thesis on the archaeology of the South Kaipara Peninsula (Spring-Rice 1996).

Ōtakanini Tōpū is a Māori incorporated farm on the South Kaipara Peninsula, just north of Te Awaroa (Hellensville). Ōtakanini Tōpū was surveyed by Vanessa Tanner, Leah McCurdy, and Malcom Patterson where over 210 sites were on the property. The project aimed to prioritise management recommendations for archaeological sites and the cultural landscapes (Tanner et. al. 2012). The project helped design a sustainable farming plan for managing and protecting sites.

Excavations at Waioneke Pā (Q10/32) on the South Kaipara peninsula were undertaken in 1968-69 by a team led by Les Groube. Only an interim report was prepared, but in 2001 Natasha Lynch presented an in-depth report on the excavation, although there were aspects of data not available to her or were missing (Lynch 2001). Waioneke Pā is around 15 km across the Kaipara Harbour from Q09/993 at Puatahi. Three occupation layers were identified, all of which had midden, artefacts, pits and associated structures. Burials were found. One large pit had a half-burnt kete with carbonised kūmara in it. The kūmara sample was collected and sent to Bishop Museum (Lynch 2001). Eleven dates were taken from the site, some of which were calibrated by Garry Law in 2001. The samples do not meet current chronometric hygiene standards, but all generally indicate a late period of settlement.

Analysis by Geoffrey Irwin into pā around the South Kaipara Head and Pouto area identified patterns of site distribution in the South Kaipara (Irwin 1985). These study areas are around 20 km across the Kaipara Harbour from Puatahi and Q09/993. This project accurately mapped dozens of pā in Pouto, classified them on several identification systems, and undertook systematic excavations at Waikere Creek Pā (N33/243) and Wharepapa Pā (N33/238) (Irwin 1985: 55). The results showed that there was almost one pā per square kilometre, which raises questions over why so many pā were present for the population. This supports a narrative by Janet Davidson (1984) which is that pā were just as much a symbol of community and prestige as they are defence. Irwin concluded from radiocarbon dates from 12 sites that there was no distinct change over time with pā morphology or patterned distribution of pā across the landscape based on time (1985: 77). Other findings made by Irwin that were the pā were all occupied in a very narrow window of time, or possibly around the same time (Irwin 1985: 77). Those samples may provide different results after new chronometric hygiene standards and calibration curves (Anderson 1991; Petchey and Schmid 2020). However, the results did show that site locations favoured the natural ground relief (and therefore defensibility) over ground elevation. The study also identified that proximity to fresh water was more important than proximity to the harbour, that undefended sites (midden, pits, terraces and drains) were very close to pā, and that sites furthest from pā were other pā (Irwin 1985).

There are likely to be many aspects of pre-European Māori and pre-1900 European land use that are not represented in the current record. Missing are small pit sites, isolated terraces, garden sites, undefended settlements and resource extraction sites. Early European sites are scarce in the SRS, especially those associated with the kauri timber industry and other non-domestic sites. Research by Graeme Murdoch (1988) hints at the extent of missing sites from the record.

Summary of assessment for authority 2020/275

The tower stands on the top of site Q09/993 within land that was the Puatahi settlement (Murdoch 1994) (Figure 4). The tower was installed in 1951. The site commands views of both the Kaipara Harbour mouth and the Hōteo River mouth. The site was recorded in 2001 by Kim Tatton and Vanessa Tanner, who speculated the site was the same site recorded by Janet Davidson in 1969 as site Q09/49, which upon review of the two SRS records seems logical. Based on early survey plans, the site was surrounded by a natural defence of swampy land in all directions but south west (Figure 2). That land has been drained but the outlines of creeks remained visible in the 1960s (Figure 3).

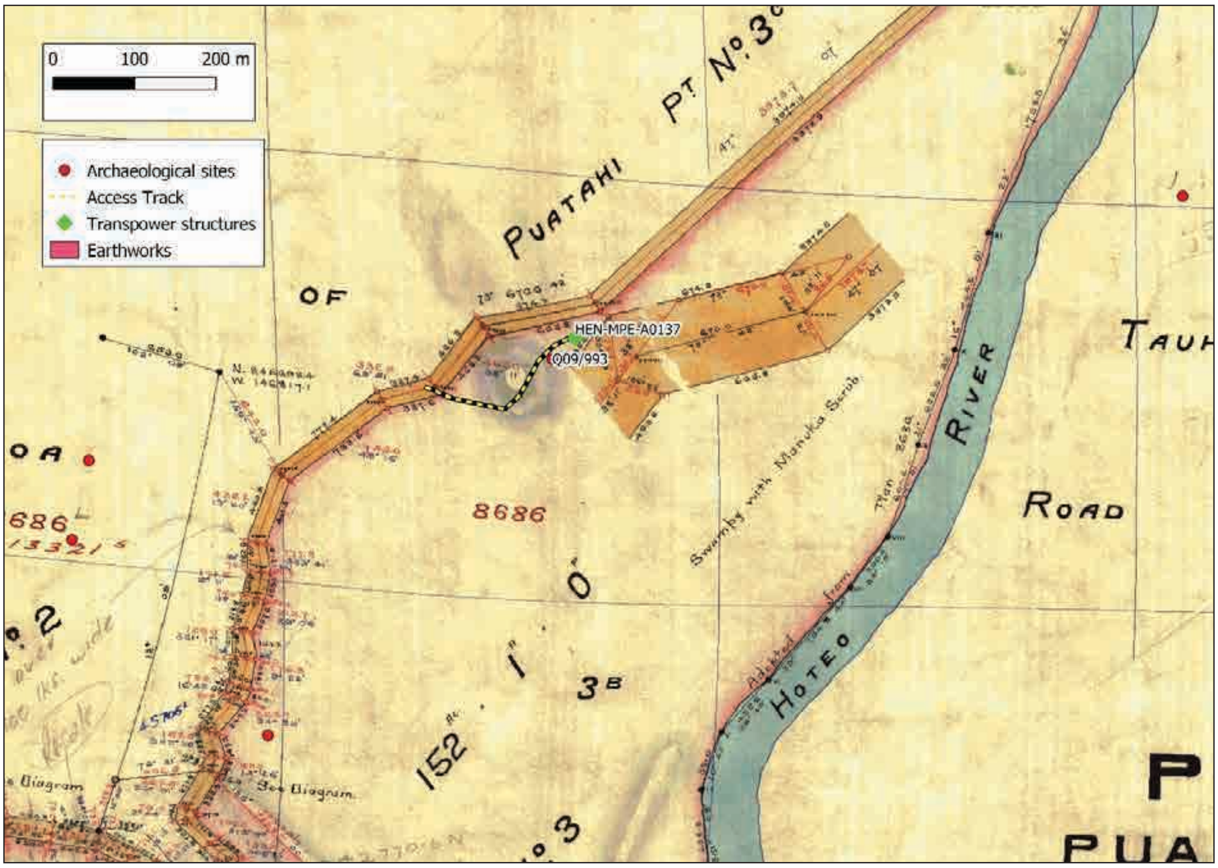

Figure 2. Detail of survey plan ML drawn in 1915 showing the elevated land where Q09/993 is located.

There was unrelated unauthorised ground disturbance on the north face of the slope which has exposed midden for an unauthorised residential build on the site. The site damaged was assessed by Isaac McIvor of HNZPT (McIvor 2019). This report determined that earthworks for the construction of three building platforms with a shared a driveway which damaged midden deposits which are part of Q09/993. The midden that was exposed and displaced included tuangi, pipi, mud snail and scallop. McIvor (2019) identified at least nine midden deposits disturbed or capped during the unauthorised work, and several possible terraces running down the south slope of the land (Figure 5).

Methodology

The works involved excavating three 8 m long and 400 mm wide trenches around the outside of the tower, removing the topsoil and subsoil to a depth of 600 mm in most areas (Figure 6). A single 1.8 m trench also fed from a corner of the trenching toward the tower foundation of a leg, as well as four augured holes in each corner of the trenches. No other ground disturbance occurred. These works extended beyond the original footprint of the first tower installation – this is where archaeological deposits were exposed. All topsoil removal was hand dug under a controlled archaeological excavation by the Section 45 archaeologist, the removal of all sediments and deposits was done by hand until natural subsoils were reached.

Under the provisions of the Archaeological Management Plan, no vehicles other than a single 3-tonne digger accessed the tower. All parking remained on the established driveway

Figure 3. Aerial of the pa taken in 1966 with tracks and tower overlaid (SN1886/P/3).

Figure 4. View from the high point of Q09/993 facing north to tower HEN–MPE–A0137.

from previous unauthorised residential works. The digger tracked up to the top of the tower on rubber matting so no scuffing of the ground occurred, which was a high-risk as the ground surface had become irregular from cattle pugging which is severe in some areas, as well as the presence of possible slumped terraces present (Figure 7). Two midden features were exposed, one on the east trench and one at the south trench (Figure 9 to Figure 12). Four chert flakes were exposed, their findspots are recorded on Figure 6.

All works were monitored by the Danielle Trilford from 23 March 2020 and were completed on 4 May 2020 after the Level 4 and 3 Covid-19 lockdown. All features exposed were flagged and numbered, recorded, and then investigated by hand using standard archaeological procedure. All the material exposed in the trenches were excavated in full. Both midden features that were exposed extend into the baulks of the works area so remain in situ. Bulk samples were taken from all features. All material culture was retained, and their contexts recorded, either the feature (midden) they were found in or their location.

Results

There were two midden deposits exposed below the topsoil (Features 1 and 2). Four flakes of chert were exposed at the interface between the topsoil and natural subsoils. A charcoal filled cut was found beneath the midden deposit at feature 2.

Feature 1

Feature 1 is a shellfish midden that was exposed in the east trench. The midden was 1100 m long in the trench and extended into both baulks of the 400 mm wide trench, so

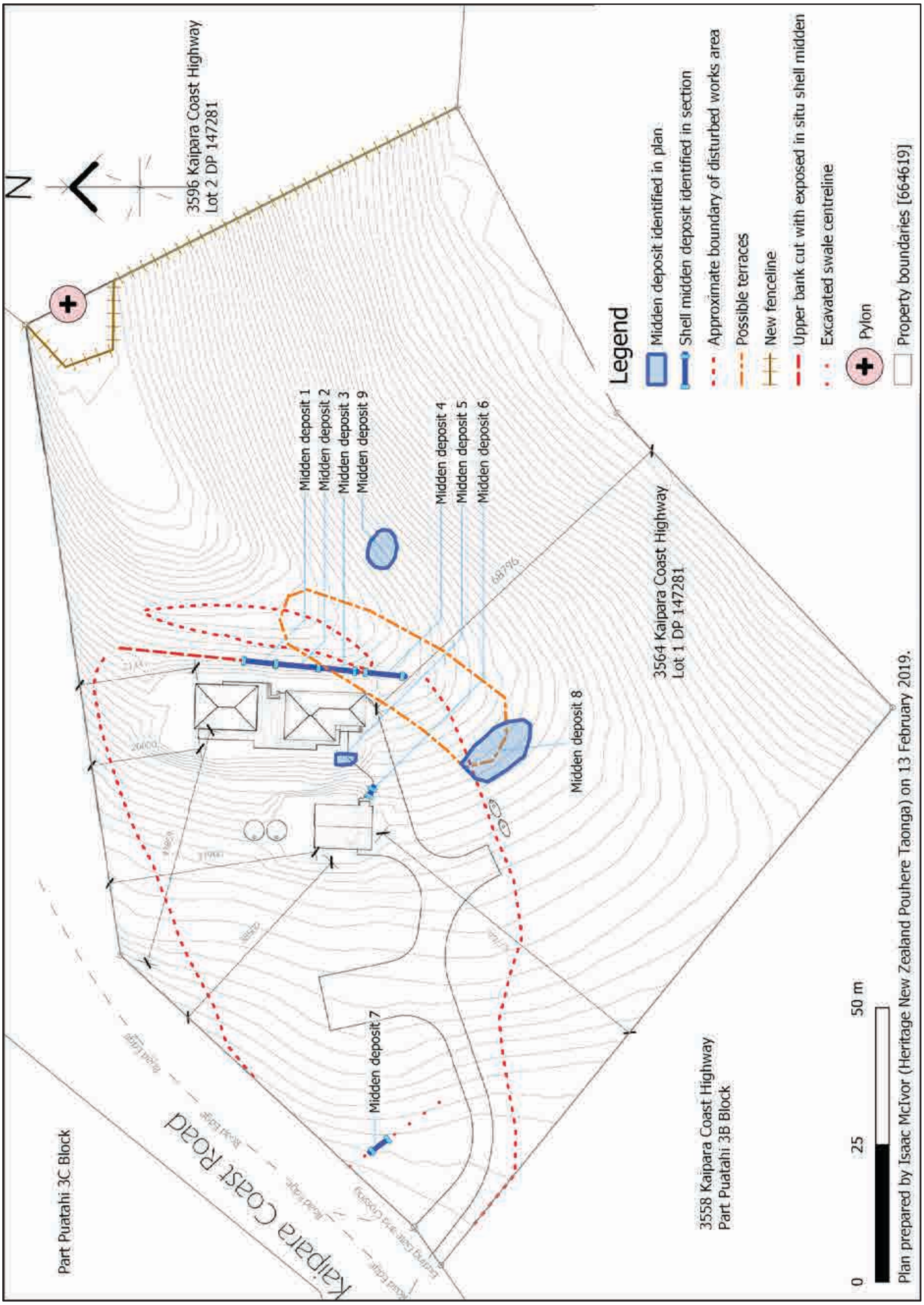

Figure 5. HEN–MPE–A0137 tower and access route overlaid on site map (based on McIvor 2019: Figure 3).

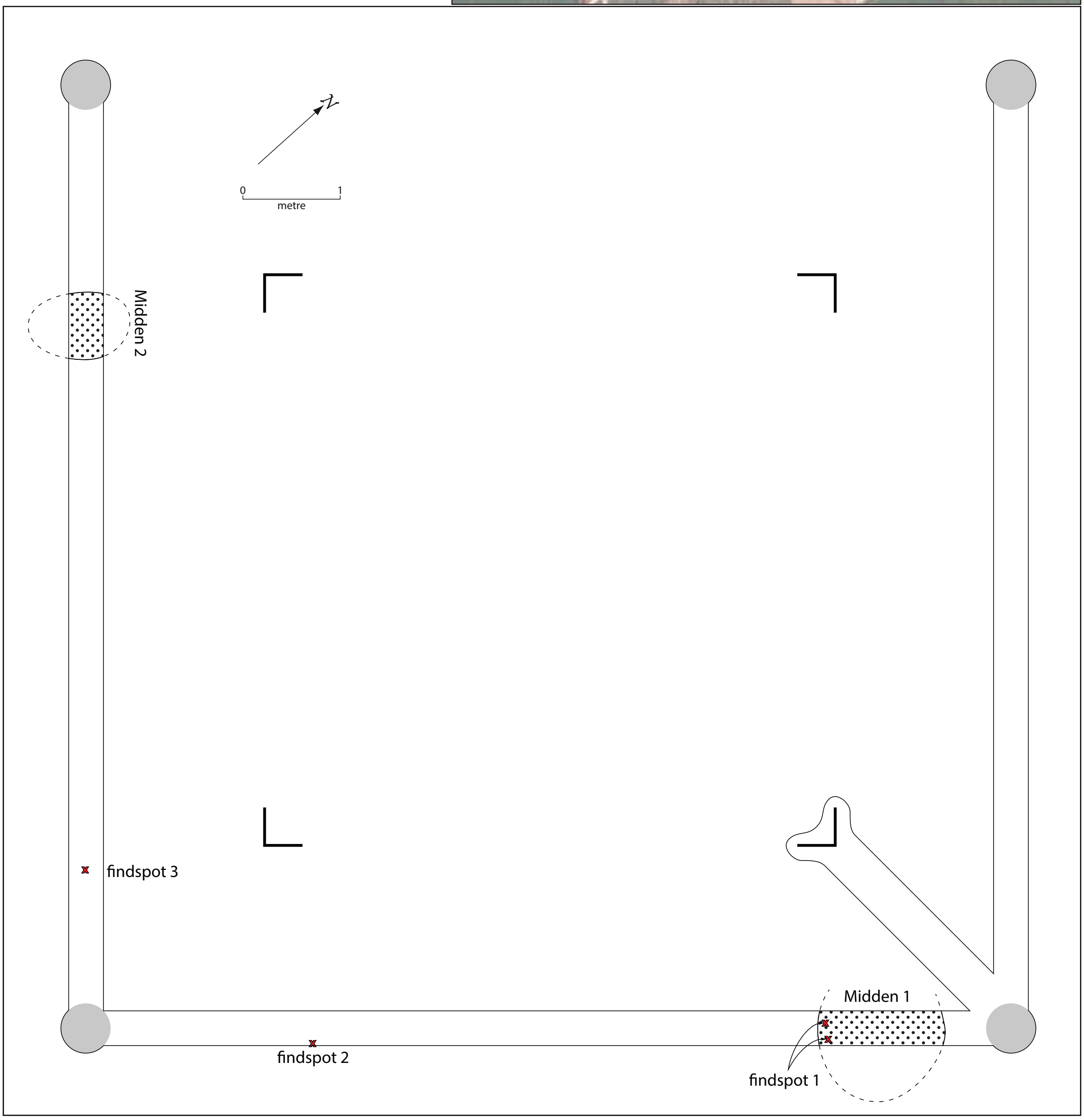

Figure 6. Plan showing works are and features exposed; top, location of HEN–MPE–A0137 on the pā.

the true width is unknown. The deposit was 100 mm thick (Figure 13). Probing around the trench was unable to be done in the very hard, compact soils over the summer months, however some probing at a later visit determined that the midden likely extends around 800 mm below the ground surface to the east. Probing on the west side of the trench did not detect any evidence of midden, although it could be present but sparse.

Feature 2

Feature 2 is a deposit that was 590 mm long inside the south trench, the material extended into both baulks. The deposit was 420 mm thick (Figure 14). The feature is a cut that has loosely compact midden with loosely compact charcoal at the base of the feature. This feature was oval in plan, and had a sloped side with a cupped base (Figure 14). The interface between the charcoal matrix and the upper shell midden was indistinct and the two layers were mixed for about 120 mm. While the cut of the feature appeared to be a posthole, it had multiple charcoal species in it and so the charcoal did not derive from a single post.

Analysis

The midden samples were returned to the lab where they were sieved through a 3.2 mm screen and air dried before being sorted to class – shell, bone, lithics and charcoal. These classes were then passed on to the relevant specialists for analysis.

Figure 7. Rubber matting used to track digger up the pā.

Figure 8. View of Hōteo River Mouth and Kaipara Harbour from top of the pā.

Figure 9. Feature 2 after excavation.

Figure 10. Feature 2 after excavation on the south trench.

Figure 11. Feature 1 (in left trench) before excavation, facing south west.

Figure 12. Feature 1 in profile at corner of north and east trenches, facing east.

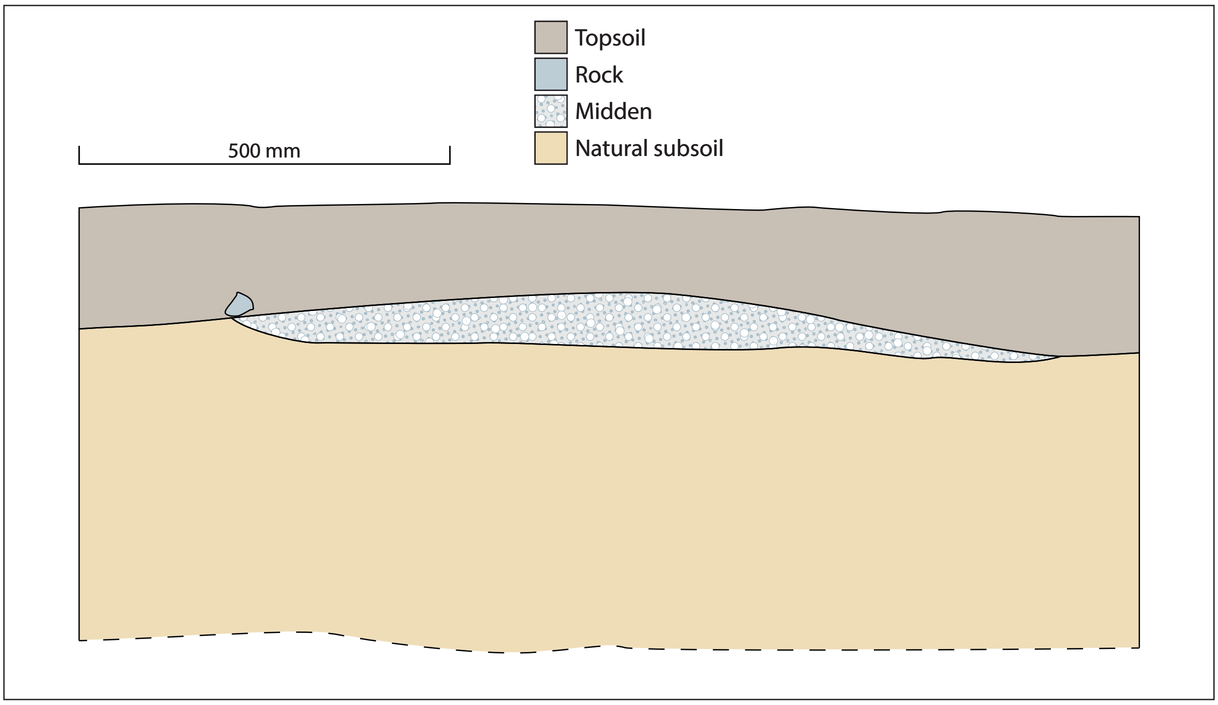

Figure 13. Stratigraphic profile drawing of Feature 1 in the east baulk.

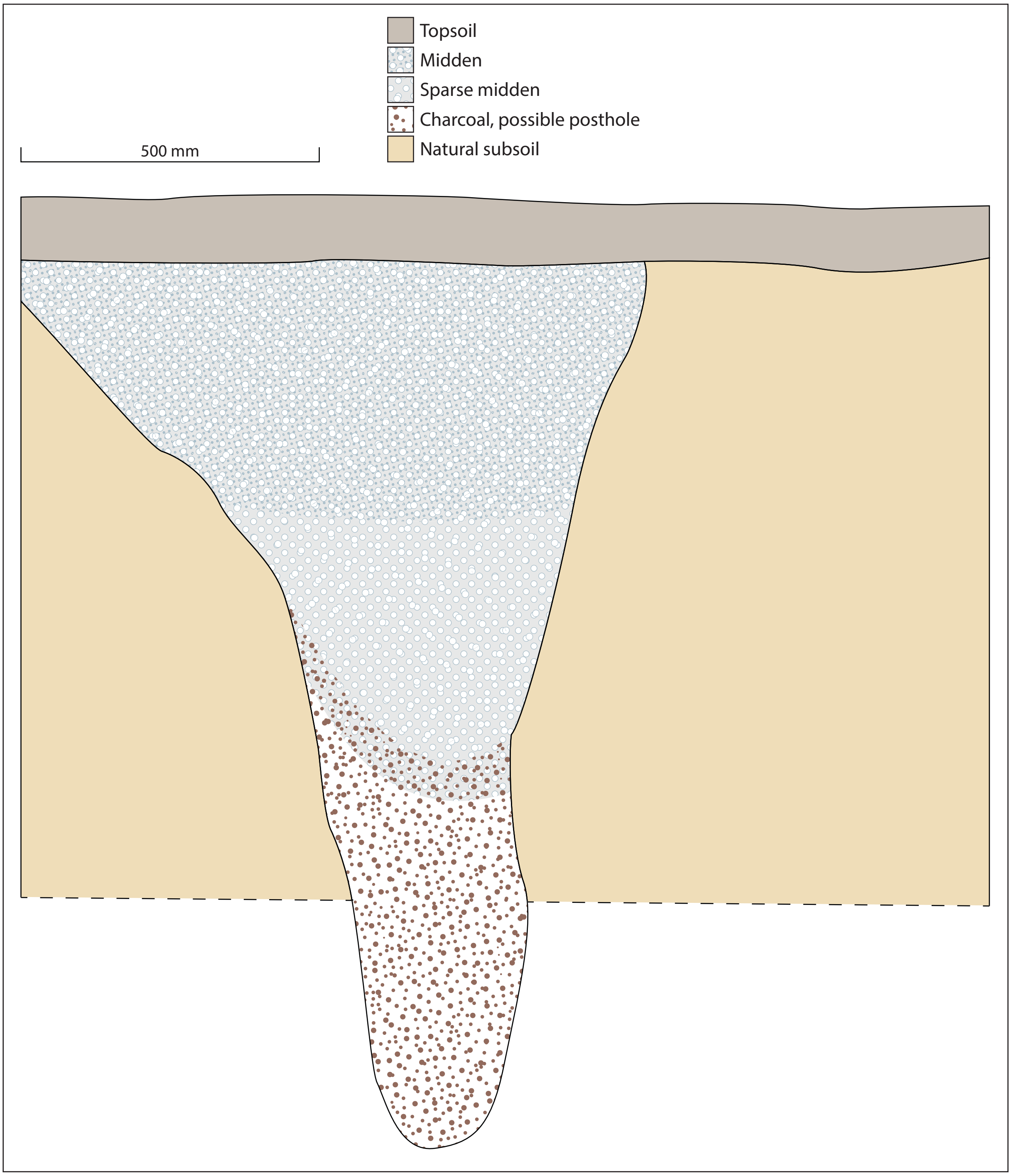

Figure 14. Stratigraphic profile drawing of Feature 2 in the south baulk.

Material culture

The only material culture recovered was stone artefacts. These were analysed by Brendan Kneebone of CFG Heritage following the methodology outlined in (Andrefsky 2005; Holdaway and Stern 2004; Phillipps et al. 2016; Turner and Bonica 1995). Four chert flakes were recorded as findspots during the excavation, the remainder were recovered during midden analysis.

The assemblage contains three probable material rock types: obsidian, chert, and a fine-grained volcanic material, most likely a basalt. Many were small flakes, less than 10 mm, and so are classed as shatter and not able to be analysed any further, but five larger artefacts, all chert, were present: one complete flake, one broken flake and two flaked cores.

There were four shatter fragments of fine-grained stone, most likely basalt. Basalt is locally available within the Northland Tangihua Complex (Phillips et al. 2016), which is the most likely source of this material, although other, more distant sources (e.g., Tahanga on the Coromandel Peninsula) are possible.

Four fragments of obsidian were recovered, all smaller than 10 mm. These were grey in transmitted light, and probably originate from Aotea (Great Barrier Island) or from along the Coromandel Peninsula. These fragments were too small for further analysis.

There were five chert pieces. The term 'chert' is used for all material that appears to be a highly siliceous (such as flint, chalcedony and jasper) but cannot readily be classified into other well-known stone types (Moore 1977). Cherts are difficult to source (Sheppard 2004) but can be sorted into groups based on physical characteristics such as colour and inclusions. Three chert types were identified based on colour and flaking quality from this assemblage:

- Type A is a medium to high quality stone, dark reddish-brown in colour.
- Type B is medium quality stone, dark grey in colour.
- Type C is a high-quality stone and white in colour, possibly chalcedony.

Samples 7 and 8 are flaked cores of Type A chert. The reduced size and radial flake scarring on all surfaces indicate an intensive reduction strategy used to produce expedient, sharp edged flakes, with Sample 7 showing nine negative flake scars, and Sample 8, seven.

Sample 9 is a complete flake manufactured from what is most likely chalcedony (Type C), the lateral margin along the dorsal surface shows macroscopic striations and notches - which is a probable indication of use.

Table 1. Chert artefacts.

Sample	Type	Portion	Length (mm)	Width (mm)	Thickness (mm)	Weight (g)	Cortex %
4	Fragment	N/A	12.97	15.83	7.6	1.9	0%
7	Core	Complete	26.59	17.13	12.57	4.8	0%
7-1	Broken Flake	Distal	20.83	37.78	7.93	8.5	0-25%
8	Core	Complete	21.91	21	10.59	4.6	0%
9	Flake	Complete	26.61	30.84	8.33	6	0%
Mean			21.78	24.52	9.40	5.16	
Std. Dev.			5.59	9.46	2.12	2.39	

Charcoal

Charcoal was analysed by Ella Ussher of CFG Heritage following the methodology outlined in Chabal et al. (1999), Théry-Parisot et al. (2010) and Dotte-Sarout et al.

(2015), although the sample sizes were lower (50 fragments) than recommended (200–400 fragments).

Sampled charcoal from Features 1 and 2 represent a diverse range of species, all of which fit the geographic location and environment surrounding the site from which the sample was collected. Mangrove was also identified which indicates that these coastal mudflat species were also an exploited resource. These are all species that thrive in an environment of secondary growth after initial forest clearance. Northern rātā is particularly noted for utilizing the burned-out carcasses of other canopy species to facilitate its new growth, initially as a climber and then as an established tree itself. The identification of horopito, an upland species known as the pepper tree of which bark was used for medicinal purposes, possibly indicates trade as this was likely imported for this purpose.

Feature 2 Sample 5 was from the feature below the midden. It was dominated ponga with small amounts of other species, indicating that this material does not derive from a burnt out post. It may be rake-out from a cooking fire, or possibly even a burned stump with rake-out mixed in from the midden above.

The charcoal represents firewood selection during the pre-European Māori occupation of the pā site, but also reflects the environment from which the firewood was gathered. Firewood selection targeted easy to access and burn tree ferns and shrubs but the small amount of broad-leaves such as taraire, māpou and northern rātā suggests that either primary forest stands remained in the vicinity, or forest regeneration was well established at the time the wood was collected. Mangrove was also taken from the coast of the Kaipara Harbour. The only species that differs from these is Horopito, which is an upland species and can be a medicinal plant, and was possibly imported for this purpose. These species do not present a comprehensive picture of all vegetation surrounding the site, just those selected for burning in cooking fires and survived as charcoal rather than turning to ash.

Table 2. Summary of species identified during charcoal analysis of Feature 1 and 2 samples.

		Feature 1		Feature 2		Sample 5	
Species		Count	%	Count	%	Count	%
Bracken (*Pteridium* sp.)	Ferns	1	2	1	2		
Ponga/fern (*Cyathea* sp.)						30	60
Kōwhai (*Sophora* sp.)	Small trees and shrubs	2	4	4	8		
Mānuka (*Leptospermum scoparium*)		27	54	12	24	1	2
Karamū (*Coprosma robusta*)						2	4
Ngaio (*Myoporum laetum*)				4	8		
Horopito (cf. *Pseudowintera colorata*)				4	8		
Hebe (*Hebe* sp.)		2	4	1	2		
Cassinia (*Cassinia* sp.)		8	16	1	2		
Māpou (*Myrsine australis*)				4	8		
Northern rātā (*Metrosideros robusta*)	Broad-leaves			10	20		
Pūriri (*Vitex lucens*)		5	10	1	2		
Taraire (*Beilschmiedia taraire*)						5	10
Conifer	Conifer			1	2		
Mangrove (*Avicennia marina*)	Mangrove			5	10		
Unidentified rootlets	Other	3	6	1	2	12	24
Unidentified endocarp			2	4	1	2	
Total		50		50		50	

Shellfish

Shellfish was analysed by Danielle Trilford of CFG Heritage. Species identification was based on Morley (2004). Counts are given as MNI (Minimum Number of Individuals), which is the Number of Identified Specimens (NISP) for gastropods, and NISP divided by two for bivalves.

All four assemblages were 10 litre bulk samples. One was from Feature 1, the other three are from Feature 2. All the assemblages had a sufficient MNI count for a detailed analysis (Somerville et. al. 2017: 219; Campbell 2017).

The identifiable shellfish from both features was dominated by tuangi (*Austrovenus stutchburyi*) both in MNI and weight classes. Tuangi are collected from soft shores like harbours and muddy sheltered areas, which dimonate the Kaipara Harbour near the site. Other species were also largely soft shore species but occasional oyster (*Crassostrea gigas*) shows that mid-tidal rocky areas within the harbour were also targeted.

Table 3. Shell counts by feature.

	Feature 1		Feature 2		
Species	MNI	Weight	MNI	Weight	Environment
Tuangi (*Austrovenus stutchburyi)*	832	251	518	821	Soft/sandy shore
Mudsnail (tītiko, *Amphibola crenata*)	2	2	8	24	Soft shore
Purple-mouthed whelk (kawari, *Cominella glandiformis*)			9	2	Soft shore
Oyster (tio, *Crassostrea gigas*)	1	1	6	72	Rocky within harbours
Horn shell (koeti, *Zeacumantus lutulentus*)	6	1			Soft shore
Scallop (tipa, *Pecten novaezealandiae*)	1	1	4	43	Soft/sandy shore
Pipi (*Paphies australis*)	3	1			Soft shore
Lined whelk (kawari, *Buccinulum vittatum vittatum*)	1	1			Various
Unidentified gastropod		1			
Residue		973		1922	
Total	846	1232	870	2884	

Harvesting methods

It was observed during analysis that the tuangi were generally small and heavily fractured including the diagnostic hinge fragments. This is particularly the case for Feature 1, where the ratio of identified hinges to weight was 1664 hinges: 251 g; less so for Feature 2 – 1035 hinges: 821 g. These observations are reinforced by the quantity of non-diagnostic shell fragments (residue) by weight: 79% for Feature 1 and 66% for Feature 2. The small sizes of tuangi from Feature 1, less so from Feature 2, could indicate various collection scenarios, or a combination of these. The scenarios include:

1. "Patchiness": collection methods from a patch which happened to have small valves

This is when the species population within the harbour were simply small at that specific harvesting locale. Shellfish of all different sizes are not simply spread uniformly across a shoreline, instead they are broken into a mosaic of smaller patches at different rates of growth,and immediately adjacent patches on the same shore will have different average sizes (Campbell 2017b: 283; Thakar et al. 2017).

2. Collection was using a non-selective collective method such as a type of dredging or raking, where smaller species are collected.

Similarly, the bulk collection methods such as dredging or raking may have occurred. This seems likely based on the smaller valves and sheer quantity of shellfish present. Deliberate selection (such as hand picking) is likely to provide a narrow range of individuals in terms of size and age (Somerville et al. 2017: 28). A wide distribution of shell size may represent shellfish mass collection, or more than one collection event, hence the need to couple the results with chronometric data.

3. Overexploitation

This occurs when the shellfish are collected from an area which has already been harvested recently and the species in the area have not yet recovered.

Often exploitation intensity is best represented in the co-variation of the maximum and minimum size of the species in a sample (Campbell 2017b: 283). The small tuangi at Q09/993 could be due to over-exploitation, non-selective methods, or patchiness – the three scenarios cannot be tested in this investigation because valve sizes were observed, not measured.

A factor which also contributes to understanding the harvesting techniques is the presence of other species. Small gastropods such as the lined whelk (*Buccinulum vittatum vittatum*) and purple mouthed whelk (*Zeacumantus lutulentus*) live at similar tidal depths and environments as tuangi. These smaller gastropods have limited nutritional or caloric value and are best interpreted as bycatch from non-selective harvesting methods. Interpretations of smaller mudflat gastropod species as by-catches have been made elsewhere in archaeological investigations (Furey 2004: 18, Trilford 2017: 6).

While non-selective collection on the soft shore was the primary source of shellfish, the presence of oyster from the rocky shore shows that other environments were also exploited, while scallop indicates opportunistic hand collecting. This species is mobile (Morley 2004) and is often washed ashore after storms. The site overlooks the Kaipara Harbour and is 300 m from the water's edge, and it is probable that people were utilising the nearest resources.

There are at least other 9 midden deposits on pā Q09/993, these were identified during the damage assessment (McIvor 2019). The presence of these deposits indicates more can learnt with other faunal deposits on site, and shows shellfish processing was not isolated to one part of the site.

Bone

Bone was identified by Matthew Campbell of CFG Heritage. Only a few bones were recovered from the samples. From Feature 2 several rat bones were identified, probably kiore (*Rattus exulans*) representing at least two animals. Also from Sample 2 were the palatine and cleithrum of an unidentified small fish. From Feature 1 a single tarakihi (*Nemadactylus macropterus*) caudal vertebra was identified. Tarakihi inhabit a variety of habitats and can be caught with baited hooks or netted.

Chronology

Four samples were submitted to the Waikato University Radiocarbon Laboratory for radiocarbon analysis (Table 4), a shell–charcoal pair from each feature.

The dates indicate occupation between the 17th and 19th centuries. Combining the shell charcoal pairs (Figure 15) indicates that Feature 1 is more clearly pre-European, but Feature 2 potentially extends into the colonial period, although no European material culture was found.

These results broadly match the late chronology of site use seen at Poutu by Geoffrey Irwin (1985). If Feature 1 was little older than Feature 2 as the results indicate, this indicates that the site was occupied for an extended period, or alternatively, that it was briefly abandoned and then re-occupied. Those details cannot be determined from this small-scale excavation.

Table 4. Summary of radiocarbon results.

Wk number	Sample type	Context	CRA BP	cal AD 68.2%	cal AD 95.4%
52201	Shell	Feature 1	596 ± 27	1650–1830	1580– 1940
52203	Charcoal (mānuka)	Feature 1	206 ± 19	1670 – 1690 (17.4%) 1730–1810 (50.9%)	1660–1700 (24.2%) 1720–1820 (70.6%) 1830–1850 (0.6%)
52202	Shell	Feature 2	580 ± 28	1670–1850	1610–
52204	Charcoal (rootlets)	Feature 2	160 ± 18	1690–1730 (18%) 1800–1820 (1.7%) 1830–1890 (30.7%) 1920–(17.8%)	1680 – 1740 (26.9%) 1800–1900 (49.5%) 1910– (19.0%)

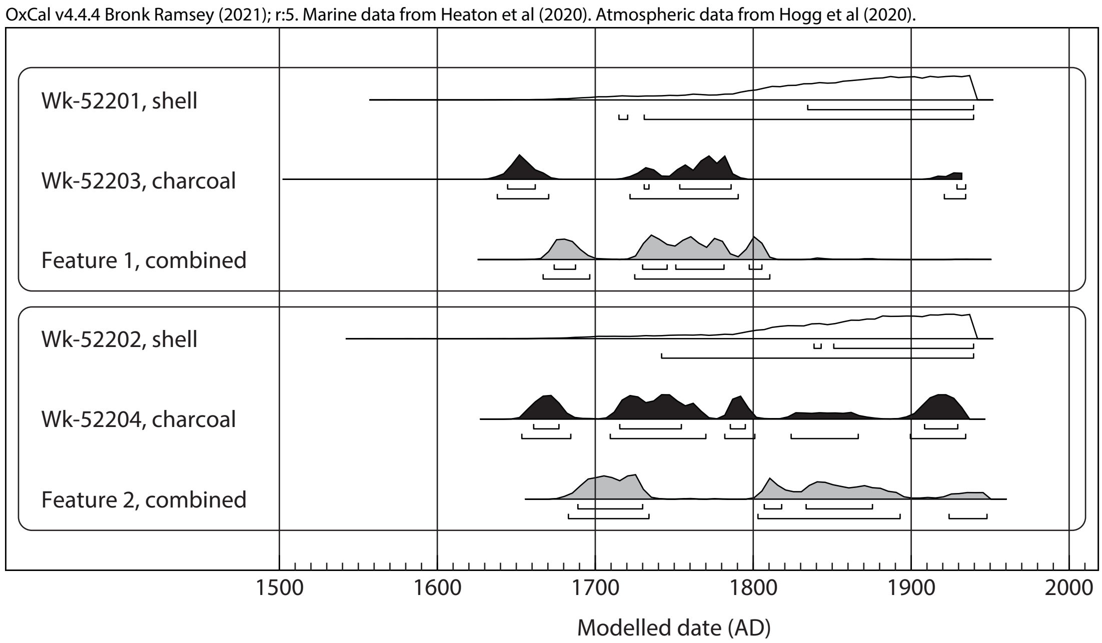

Figure 15. Multiplot of radiocarbon dates showing shell-charcoal pairs combined.

Discussion and conclusion

In 1927 when Elsdon Best wrote the first anthropological text focused on pā, he focused on documenting technical details such as palisade lashings as well as broader details such as comparing sites to overseas earthworks fortifications and creating a topographic classification of pā Māori. In the same year, Raymond Firth i (1927: 78) concluded, "…it is as the home of the people, the center of their social and economic life, no less than as their defensive stronghold and the focus of their military activity that the Maori Pa has its peculiar interest for the archaeologist, the anthropologist and the prehistorian." In 1964 Alister Buist undertook a regional study of Northern Taranaki pā, where he concluded pā construction was driven by agricultural practices and pā size was influenced by social organsiation (1964: 43-4). In 1987 Janet Davidson (1987: 15) reviewed dozens of pā studies since Best's 1927 study and stated, "It would now be generally accepted, I think, that the functions of *paa* varied, both regionally and individually. Some were indeed fortified villages, some were more in the nature of fortified stores, and others may have been mainly refuges or citadels. As Lilburn (1985) has recently shown, the settlement function was often just as important as the defensive function."

The first attempt of classification of pā in New Zealand by Elsdon Best (1927: 15-16) was based on the topography and physical conditions where the pā was built, namely:

1. Flatland pā
2. Hillforts which are subdivided into:
   a. on ridges and spurs
   b. those on isolation hills peaks and hillocks
   c. those on headlands and promontories
   d. those on cliffs
3. island forts of refuges including swamps.

The work was a useful foundation for other pā examinations (for example, Golson 1957). Around 50 years later, Aileen Fox (1976) investigated and published her research on pā, and similarly concluded that varieties of pā could be commonly classified by the type of site they occupied: headland, swamp, ridge, or flatland. She proposed that the defensive form of a pā was influenced by the type of attack anticipated. Les Groube (1970) proposed a classification system of 3 pā types based on defensive systems, these can be summarised as:

Class 1 pā with terraces only.
Class 2 pā, usually on promontories or ridges, defended by transverse ditches and banks, often barring the route of easiest access which is narrow.
Class 3 sites defended by ditches and banks on more than one side. Usually delimiting a flat rectangular or sub-rectangular interior. This include "ring-ditch" pā. This class has two subgroups:
Subgroup 3a without associated terrace
Subgroup 3b with associated terraces

As Davidson (1987: 16) noted: "Groube's classification (1970), although it can be used without strings as a descriptive classification, was designed to serve an analytical and culture historical purpose. For this reason, it has to be used carefully…" Archaeological typologies are developed to answer particular questions, and may not be relevant to questions archaeologist want to ask 50 years later.

Understanding existing pā typologies and classification systems can help examine if Q09/993 is a pā according to the archaeological definition, and if it is, that information will support future analysis of pā and broader Māori settlement in the Kaipara. Q09/993 is on an isolated hillock with none of the easily identified features such as ditches or banks.

There is an absence of clearly distinguishable terraces on Q09/993, but there are areas on the south slope which have possible terracing, noticed by several archaeologists when the site record has been updated over the years. If the south face terraces of the site have a defensive function, the site will be classed as a hillfort on an isolated hillock according to Best's (1927) classification system.

While Q09/993 has not been excavated enough to confidently assign it to one of Groube's (1970) classes, if the terraces show signs of defensive features, it is probably a Class 1 pā (pā with terraces only). This is because Class 2 sites require the site to be a promontory or ridge, which it is not, and Class 3 sites require defence from several ditch and banks that have flat interior platforms, of which there is an absence of based on ground surface evidence.

Fox had addressed some of those complications and the potential for incorrect dismissal of Class 1 pā by archaeologists, and makes the point that if pā identification relies on ditches and banks only, then major pā sites like Maungawhau in Tāmaki, or Otatara in Heretaunga, would have to be excluded as pā (1976: 22). She explained most terraced pā differ to open settlements because they are an isolated steep hill, where the defensive features often surround the site, such as steep natural ridges or steep scarps at the lower terracing (if present). Q09/993 has those features she describes; it is on an isolated and steep sided hill, particularly on the north face of which has a very steep natural slope, and the south side is which where possible terraces are seen. The wetlands that surrounded the pā would have contributed to site protection. While the site generally meets Groube's (1967) Class 1 site type, caution should remain without further excavation of terraces.

Fox (1976: 22) summarised this issue for many Class 1 pā, "Without excavation it is difficult to know which of the terraces were intended as a stance for the defenders behind or above the palisade… and which were built as flats for living places or stores." Should further investigations target the possible terraces on Q09/993, the function and presence of palisades on the possible south terracing could be examined which will supplement this discussion.

Alternatively, if the terraces on the south face of the site do not have evidence of palisading and the site is not classed as a pā by the archaeological definition, questions remain regarding its 'site type.' While the minimal excavation methodology protected the site, it makes aspects of archaeological interpretation difficult and there may be subsurface features present which could assist analysis. The site has a clear view of the Hōteo River mouth and Kaipara Harbour, and as an isolated hillock was presumably difficult to access across the wetlands which surrounded the site. The pā classification ofBest, Fox, Davidson, Groube, Buist and others do not directly address the utilisation of freshwater bodies around the foot of pā, but it is fair to assume that Māori would have seen these as a useful defensive feature. The hillock could have been a useful location for lookouts or an undefended settlement. The presence of stone tool preparation including evidence of macroscopic use-wear on one piece, food collection and fishing methods, firewood collection (as well as horopito, which is not commonly used for burning but may have social or culinary implications), and cooking event(s) indicates people undertook common daily tasks on site around the 1650s–1800s. Whether this was intentionally defended with palisading on the south terraces and utilising the swamps, or opportunistically defended with the presence of the swamps but otherwise undefended remains unclear and could potentially be answered another time.

There is a high density of pre-European Māori sites, and pā, in the Kaipara region. While this is the case, systematic archaeological research is minimal and there remains only a small handful of recorded excavations in the area. One of these is Peter Bellwood's (1972) investigations into Ōtakanini Pā, around 24 km south of Q09/993 on the south Kaipara Peninsula (Ōtakanini was one of Groube's (1970) Class 3b examples). Ōtakainini larger and more complex than Q09/993, with at least three phases of defensive works (Bellwood 1972). However the two sites also share similar natural features. Both are elevated on high-points separated from the Kaipara Harbour by ~300 m of wetland (now drained for pasture), with a waterway immediately adjacent to the pā feeding into the harbour (Hōteo River near Q09/993, and Upokonui Creek near Q10/44 Ōtakanini). In summary, while Q09/993 does not precisely fit the accepted archaeological definition of a pā, it seems probable that it was a defended site and should continue to be classified as a pā.

Archaeological deposits at transmission structures

It is a common and natural misconception that earthworks at transmission structures will only expose sediments that that have been disturbed during the initial phase of tower installation. Works under authority 2019/756 at Te Tiki o Te Ihingārangi Pā (tower HAM–KPO–A0001) in 2019 have shown that in situ archaeological deposits are present during these works, and the footprint of the original ground disturbance is often far smaller than commonly perceived (Trilford 2020). The works at HEN–MPE–A0137, archaeological site Q09/993, has shown that none of the ground surface exposed for cathodic protection trenching was damaged by the original 1951 tower installation.

Infrastructure and asset companies such as Transpower New Zealand have a unique role in recording and protecting archaeological sites in rural and remote parts of New Zealand.

This is because most of New Zealand's archaeological sites are recorded on an ad-hoc basis during residential developments and expansion projects like roading, subdivisions, and similar works. The majority of Transpower's transmission structures are on remote rural land which has otherwise never been surveyed or carefully considered by archaeologists. This means a great deal of information can be learnt about a landscape and newly recorded sites are added to the SRS during the transmission tower foundation programmes, through assessing and monitoring ground disturbance.

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Radiocarbon Dating Laboratory

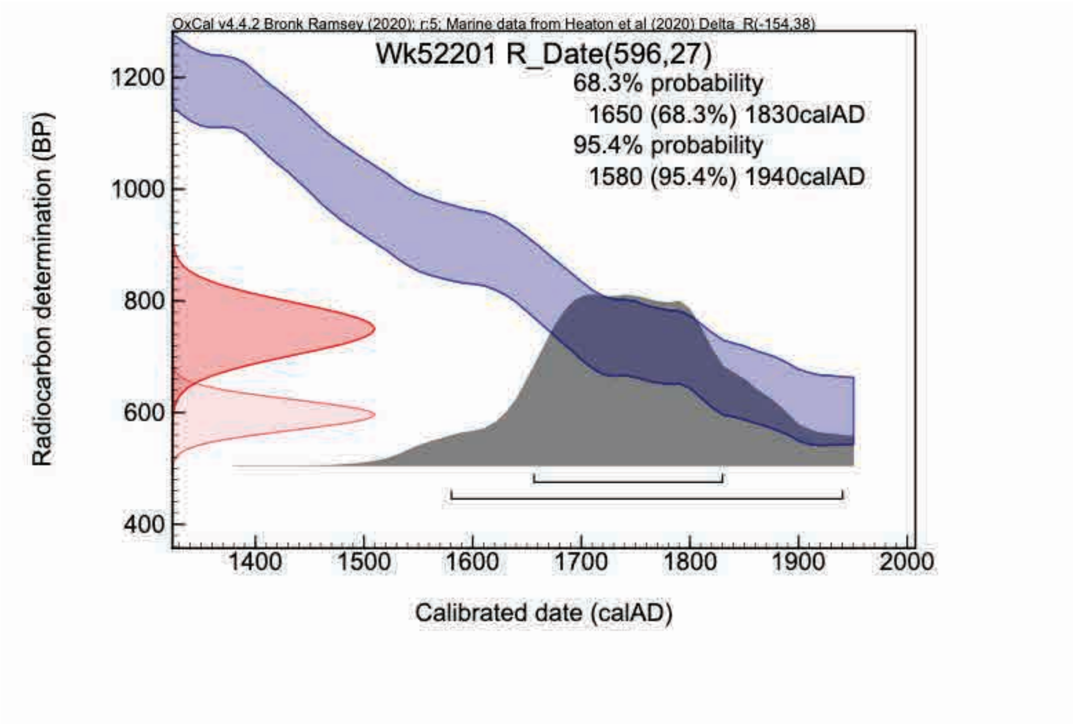
Tuesday, 2 February 2021

Report on Radiocarbon Age Determination for Wk- 52201

Submitter	M Campbell
Submitter's Code	Q09/993 Feature 1 Shell
Site & Location	Sample collected from archaeological site in Kaipara Harbor , New Zealand
Sample Material	Austrovenus (Tuangi)
Physical Pretreatment	Surfaces cleaned. Washed in an ultrasonic bath. Tested for recrystallization: aragonite.
Chemical Pretreatment	Sample acid washed using 2 M dil. HCl for 120 seconds, rinsed and dried.

$\delta^{13}C$	1.2 ± 0.3 ‰	(CRDS)
$D^{14}C$	-71.5 ± 3.1 ‰	
$F^{14}C\%$	92.9 ± 0.3 %	
Result	**596 ± 27 BP**	

Comments



- Explanation of the calibrated Oxcal plots can be found at the Oxford Radiocarbon Accelerator Unit's calibration web pages (http://c14.arch.ox.ac.uk/embed.php?File=explanation.php)
- Result is *Conventional Age or Percent Modern Carbon (pMC)* following Stuiver and Polach, 1977, Radiocarbon 19, 355-363. This is based on the Libby half-life of 5568 yr with correction for isotopic fractionation applied. This age is normally quoted in publications and must include the appropriate error term and Wk number.
- Quoted errors are 1 standard deviation due to counting statistics multiplied by an experimentally determined Laboratory Error Multiplier.
- The isotopic fractionation, $\delta^{13}C$, is expressed as ‰ wrt PDB and is measured on sample CO_2.
- $F^{14}C\%$ is also known as *Percent Modern Carbon (pMC)*.

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Radiocarbon Dating Laboratory

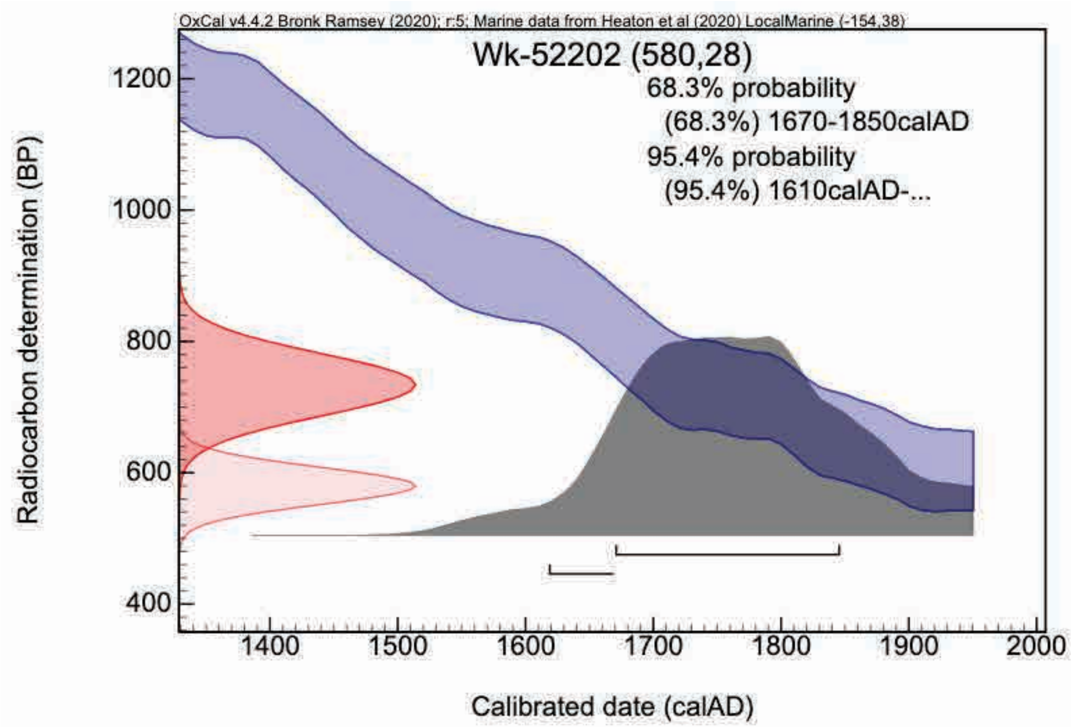
Tuesday, 2 February 2021

Report on Radiocarbon Age Determination for Wk- 52202

Submitter	M Campbell
Submitter's Code	Q09/993 Feature 2 Shell
Site & Location	Sample collected from archaeological site in Kaipara Harbor , New Zealand
Sample Material	Cockle
Physical Pretreatment	Surfaces cleaned. Washed in an ultrasonic bath. Tested for recrystallization: aragonite.
Chemical Pretreatment	Sample acid washed using 2 M dil. HCl for 120 seconds, rinsed and dried.

$\delta^{13}C$	0.0 ± 0.3 ‰	(CRDS)
$D^{14}C$	-69.7 ± 3.2 ‰	
$F^{14}C\%$	93.0 ± 0.3 %	
Result	**580 ± 28 BP**	

Comments



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Radiocarbon Dating Laboratory

Tuesday, 2 February 2021

Report on Radiocarbon Age Determination for Wk- 52203

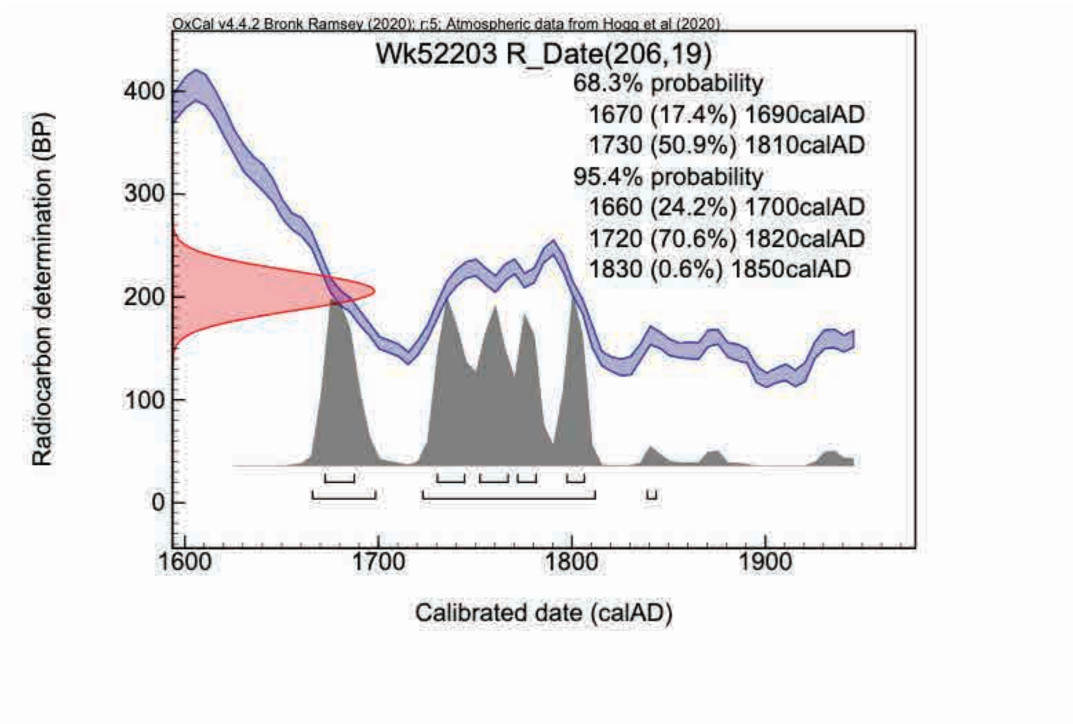
Submitter	M Campbell
Submitter's Code	Q09/993 Feature 1 Charcoal
Site & Location	Sample collected from archaeological site in Kaipara Harbor , New Zealand
Sample Material	Charcoal - Manuka
Physical Pretreatment	Sample cleaned.
Chemical Pretreatment	Sample washed in hot HCl, rinsed and treated with multiple hot NaOH washes. The NaOH insoluble fraction was treated with hot HCl, filtered, rinsed and dried.

$D^{14}C$	-25.3 ±	2.3 ‰
$F^{14}C\%$	97.5 ±	0.2 %
Result	**206 ± 19 BP**	

(AMS measurement)

Comments

Please note: The Carbon-13 stable isotope value ($\delta^{13}C$) was measured on prepared graphite using the AMS spectrometer. The radiocarbon date has therefore been corrected for isotopic fractionation. However the AMS-measured $\delta^{13}C$ value can differ from the $\delta^{13}C$ of the original material and it is therefore not shown.



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- The isotopic fractionation, $\delta^{13}C$, is expressed as ‰ wrt PDB and is measured on sample CO_2.
- $F^{14}C\%$ is also known as *Percent Modern Carbon (pMC)*.

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Radiocarbon Dating Laboratory

Tuesday, 2 February 2021

Report on Radiocarbon Age Determination for Wk- 52204

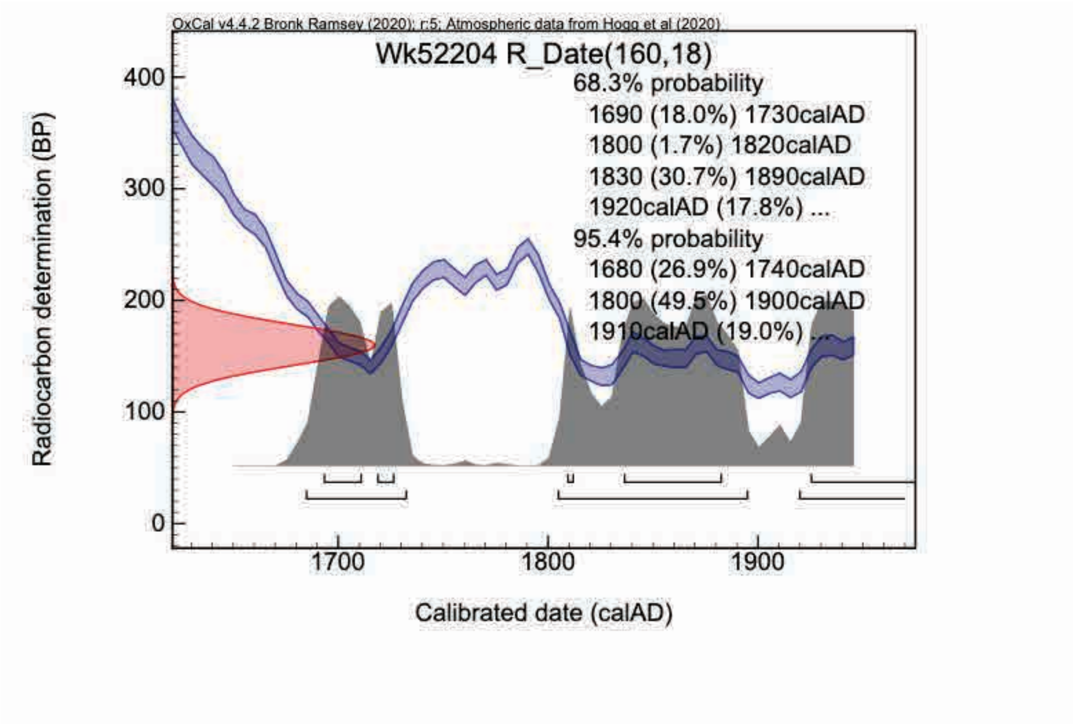
Submitter	M Campbell
Submitter's Code	Q09/993 Feature 2, Layer 3, Spit 1
Site & Location	Sample collected from archaeological site in Kaipara Harbor , New Zealand
Sample Material	Charcoal - Rootlets
Physical Pretreatment	Sample cleaned.
Chemical Pretreatment	Sample washed in hot HCl, rinsed and treated with multiple hot NaOH washes. The NaOH insoluble fraction was treated with hot HCl, filtered, rinsed and dried.

$D^{14}C$	-19.7 ± 2.2 ‰
$F^{14}C\%$	98.0 ± 0.2 %
Result	**160 ± 18 BP**

(AMS measurement)

Comments

Please note: The Carbon-13 stable isotope value ($\delta^{13}C$) was measured on prepared graphite using the AMS spectrometer. The radiocarbon date has therefore been corrected for isotopic fractionation. However the AMS-measured $\delta^{13}C$ value can differ from the $\delta^{13}C$ of the original material and it is therefore not shown.



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- Quoted errors are 1 standard deviation due to counting statistics multiplied by an experimentally determined Laboratory Error Multiplier.
- The isotopic fractionation, $\delta^{13}C$, is expressed as ‰ wrt PDB and is measured on sample CO_2.
- $F^{14}C\%$ is also known as *Percent Modern Carbon (pMC)*.