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Kawakawa Bay Stormwater Upgrade, Site S11/1083

Final Archaeological Report

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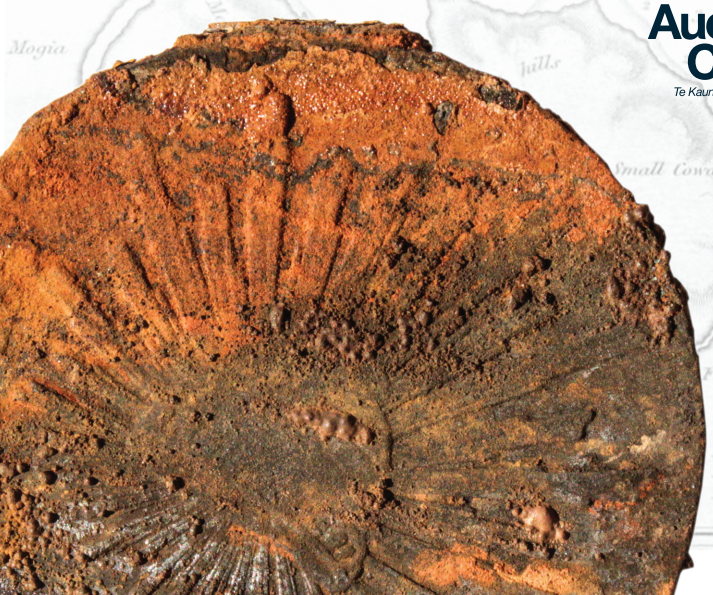
Simon Bickler (PhD)

Report prepared for Auckland Council
Under Heritage NZ Authority No. 2014/478

Auckland Council
Te Kaunihera o Tāmaki Makaurau



KAWAKAWA BAY STORMWATER UPGRADE, SITE S11/1083: FINAL ARCHAEOLOGICAL REPORT

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Part 1: Stormwater Upgrade Project

INTRODUCTION

Purpose

Auckland Council has undertaken an upgrade to a portion of the Stormwater pipe along Kawakawa Bay Coast Road, Kawakawa Bay (Figure 1). The upgrade entailed works that included:

- Construction of a stormwater outfall structure and scour protection apron within the Rautawa Stream.
- Construction of approximately 135-160m of concrete pipe (Stormwater Line A) along with associated and structures inlets.
- Connection pipes between the open channel inlet drop-structures and the main stormwater line (Stormwater Lines B and C).
- Replacement of existing eastern road culvert from the existing catchpit (Stormwater Line D) and decommissioning of the two western culverts.
- Upgrade and re-formation of the existing stormwater channel including reshaping and re-grading of the existing open channels.
- Decommissioning two existing outfalls in the reserve along the water's edge and reinstating berm.
- Replacement of three of the six existing driveway culverts with 300mm diameter culverts and the remaining three culverts decommissioned.
- Earthworks and filling operations raising low-lying areas to RL 2.3m within the road reserve fronting the residential properties.

Previous works for the Kawakawa Bay Wastewater Scheme (Harlow et al. 2012) exposed an archaeological midden recorded as S11/1083 (Figure 2 and Figure 3) extending the length of the trenched sewer line between #14 Kawakawa Bay Coast Road across Ferndale Drive and to the eastern bank of the Rautawa Stream. The site consisted of shell midden with other material such as obsidian and hangi stones visible in the trench section. As the new stormwater line was within c.10m of this trench and likely to expose further remains of the site an application for an Authority under section 12 of the Historic Places Act (1993) to modify this site was applied for and granted (No. 2014/478).

An archaeological assessment was provided with the application (Baquié and Bickler 2013) and an archaeological management plan (Bickler and Baquié 2013) was approved by the NZ Historic Places Trust (NZHPT, now Heritage NZ) prior to the works commencing.

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Report Contents

This report details the results of the monitoring of the trenching and excavations of human remains (koiwi) uncovered during the works. The report expands on an earlier draft interim report supplied to iwi, Auckland Council staff and Heritage NZ (Baquié et al. 2014). The report is a requirement of the Heritage NZ Authority and consent conditions and includes:

1) Background and contextual information regarding the results of the excavations;
2) A description of the excavations undertaken for the drainage;
3) A summary of the midden samples from the main trenching area;
4) A description of the discovery of koiwi and the subsequent excavation of those individuals (summarised from Hudson 2015, with some additional information);
5) A description of the burials and description of the coffin furniture;
6) A catalogue of artefacts; and
7) The NZAA site record form, updated with a brief summary of the works.

Osteological Report (Hudson 2015)

At the request of Maori representatives, no photographs of the burials are shown in this report. A technical report by Hudson (2015) with a more limited distributed has been prepared which includes further detailed technical information regarding the osteology of the burials and discussion of burial practices. The results are integrated into this report.

INTRODUCTION, CONTINUED

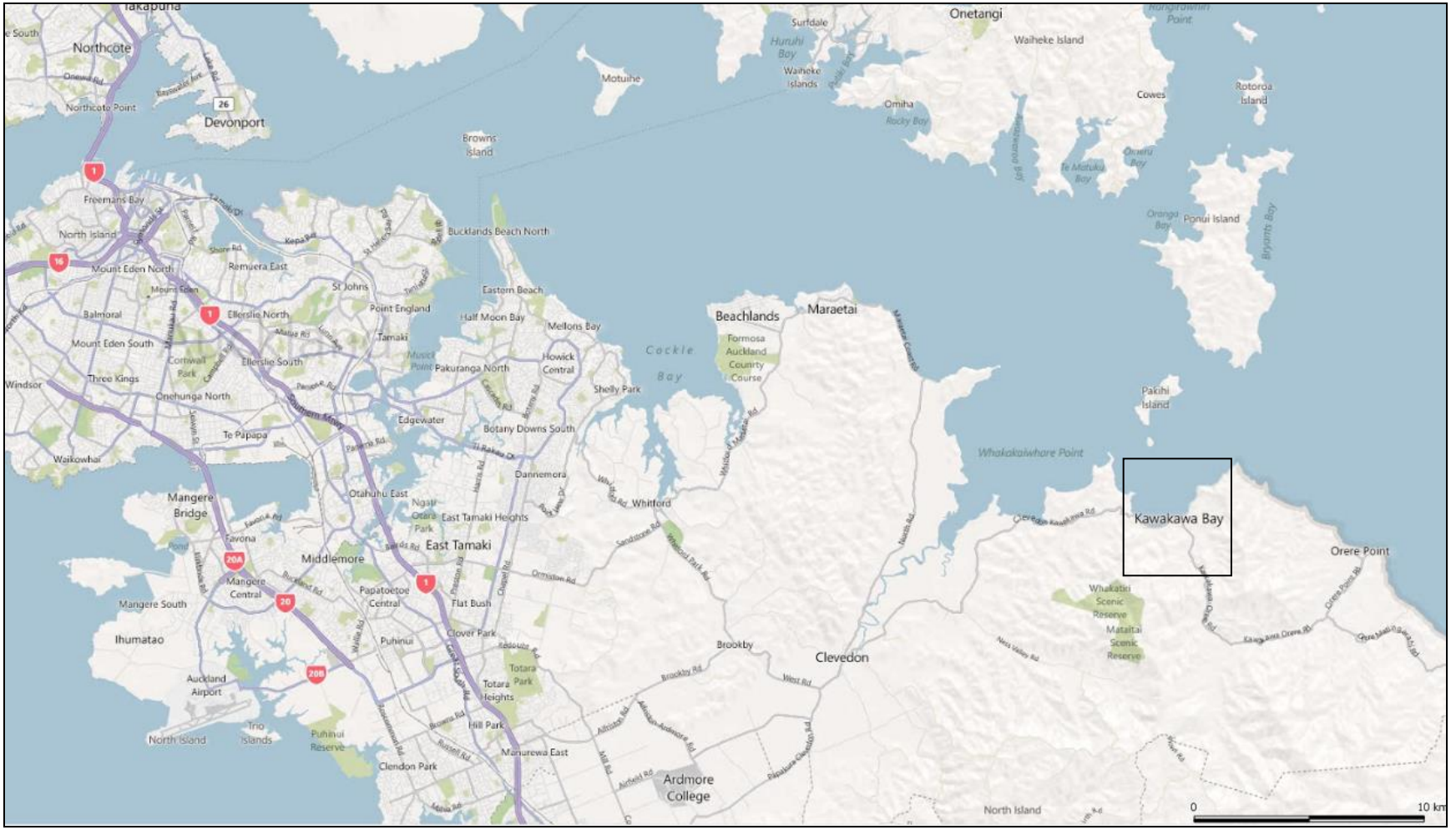

Figure 1. General location map

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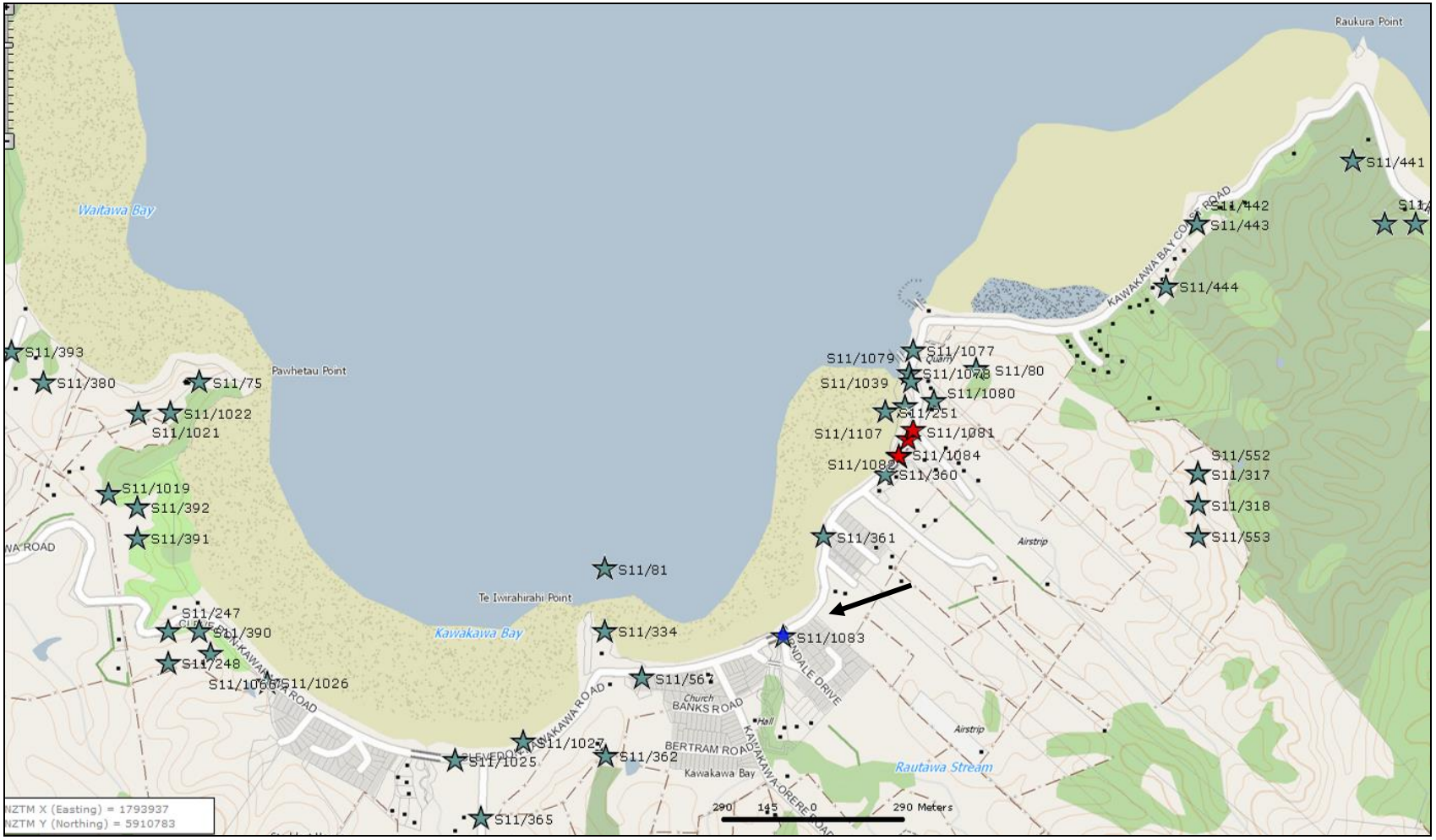

Figure 2. Location of S11/1083 and nearby recorded archaeological sites (NZAA ArchSite 2012). Locations only accurate to within c.100m

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INTRODUCTION, CONTINUED

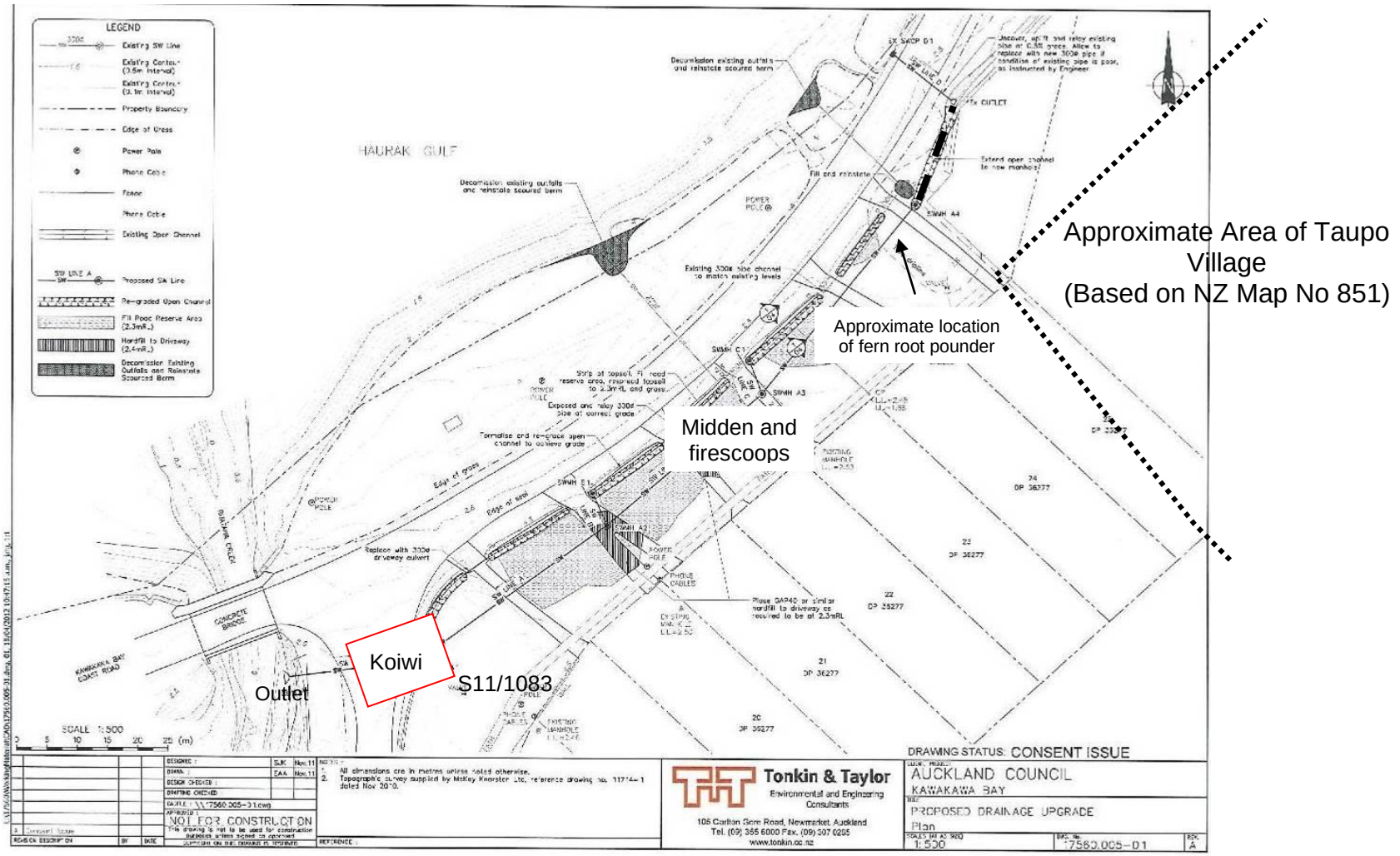

Figure 3. Works carried out showing main areas of archaeological interest

BACKGROUND

Historical Background[1]

Kawakawa Bay has a significant history for both Ngai Tai and Ngati Paoa extending over the last few centuries. While no direct archaeological evidence of the earliest settlement at Kawakawa Bay has so far been identified, the evidence from offshore islands nearby suggests that the coastline around the Bay would have been identified as suitable for occupation soon after initial settlement.

This settlement is usually identified with the arrival of the Tainui canoe and the establishment of Ngai Tai, also known as Ngati Tai, although traditions describe earlier people, Turehu, settled on the mainland. Over time Ngai Tai built kainga, or villages, and pa in suitable locations on the shores of the Wairoa River, along the coastline of the Maraetai district, on the Whakakaiwhara Peninsula (Murdoch 1996) and the islands in the Hauraki Gulf. A more detailed history of Ngai Tai can be found in recent publications by Green (2010, 2011) and McBurney (2010). Kawakawa Bay would have been attractive for Maori settlement with its abundance of food resources along a long shoreline, shallow coastal seas, nearby wetlands and streams as well as access to the inland forests.

Traditional accounts identify the ancestor Marutuahu as settling around Kawakawa Bay (Monin 2001) during the 17th century. By about 1700, hapu of Ngati Paoa and part of the Marutuahu Confederation had consolidated rights to most of the Hauraki coastline (Monin 2001:45). The vast natural resources supported large numbers of people in pre-European times and also attracted many to the area, as evidenced by the number of pa sites along the coast to the west and east, built to assist in the protection and defence of the area (see Harlow 2004; Monin 2001; Plowman 2010a,b).

Although strange sails had come to within a couple of miles or so of the west coast of the Firth of Thames since 1769, the first Europeans to land there and bring back first-hand observations were those on the missionary brig *Active*, in January 1815. Between Kawakawa Bay itself and Whakatiwai they found well populated settlements with extensive cultivations, and a rich material culture.

In 1821 Ngapuhi attacked Ngai Tai at Umupuia and continued on to Kawakawa Bay, inflicting huge loss of life (Murdoch 1993). Hauraki refugees fled to the Waikato with only fleeting return visits to repulse Ngapuhi raids.

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[1] This summary derived from Harlow et al. 2012, updated by S. Best.

The Kawakawa Bay Coast

Whether the land had been totally deserted or, as one account has it, "virtually depopulated" is not known, but it seems likely that some stalwarts remained, perhaps living far enough from the coast to be able to retreat if necessary to the fastness of the Hunua foothills. Such sites are recorded – from shell midden to pits and terraces, over a kilometre inland and some 100m asl, which probably served as refuges at some period (e.g. S11/998, 552, 315).

A map of the area dated to 1828 (Figure 4) identifies the kauri ("cowdie") forests inland and flax resources up the Wairoa River nearby but no information about any settlements. This does not mean the settlements were not present, but reflects the mapmaker's interest in establishing the navigable routes, suitable harbours and important resources for ship maintenance around Auckland.

In late 1830 Ngati Paoa returned to their ancestral lands (Monin 2001:72) and by 1833 there was a sizeable population along the Firth shores. Two small fenced settlements, Kawakawa and Taupo, with groups of houses nearby are recorded (Figure 5). In 1833, Henry Williams, accompanied by William Fairburn and two other CMS missionaries, together with a number of returning Hauraki chiefs, set out from Pahia in two small boats (with the 30 foot mission cutter *Karere* as tender) heading for Thames and in search of a suitable location for a southern mission station. They passed down the west side of the Firth, landing at selected locations and examining the countryside.

The missionaries' first stop was Pakihi Island, from where they explored a deserted Ponui; Williams' vivid description of the abandoned island is sometimes extrapolated to refer to the mainland coastal area (e.g. Fox 1974:21).

Leaving Pakihi with a wind from the west they are unlikely to have put into Kawakawa Bay itself. Their first contact with Maori that day was on "a beautiful point of land which ran far into the sea" and which was probably Raukura Point on the east side of the bay. However it appears that the coast both to the west and south-east of this held a substantial population at that time. Fairburn, on leaving Pakihi, had written "we commenced our journey up the inhabited part of the Thames." Not that the living was easy – a loaded musket and full cartouche was the order of the day, for fear of warriors from Waikato (Fairburn 1833).

Between the Wairoa River and Whakatiwai the missionaries visited or met Maori from some six settlements, and were given corn and pigs, saw fires and areas cleared for agriculture, and were welcomed by a musket salute from the crew of a canoe. At Whakatiwai they found "upwards of 300 natives assembled" – reminding Fairburn of "sheep without a shepherd" – and mustered 130 of them for evening service (Fairburn 1833; Williams 1961:340-42).

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The Kawakawa Bay Coast, *continued*

Nine years later, in July 1842, Ensign Best found a thriving community at Orere "building new houses of a description far superior to their old dens a Symptom of improvement" (Best 1966:361). An 1849-1855 map shows a village at the site of the burial excavation itself (Figure 5). Maori began having their lands surveyed in the 1860s and land sales to colonists were underway by the 1870s (Murdoch 1993:48).

While it is possible that the bay was never totally abandoned, it seems likely that the first post-1821 settlement of any size there began not long after the trek back from Waikato. Perhaps curious eyes watched Williams from Taupo Bay as his small flotilla passed by, and again when he returned three weeks later on a bright moonlit night.

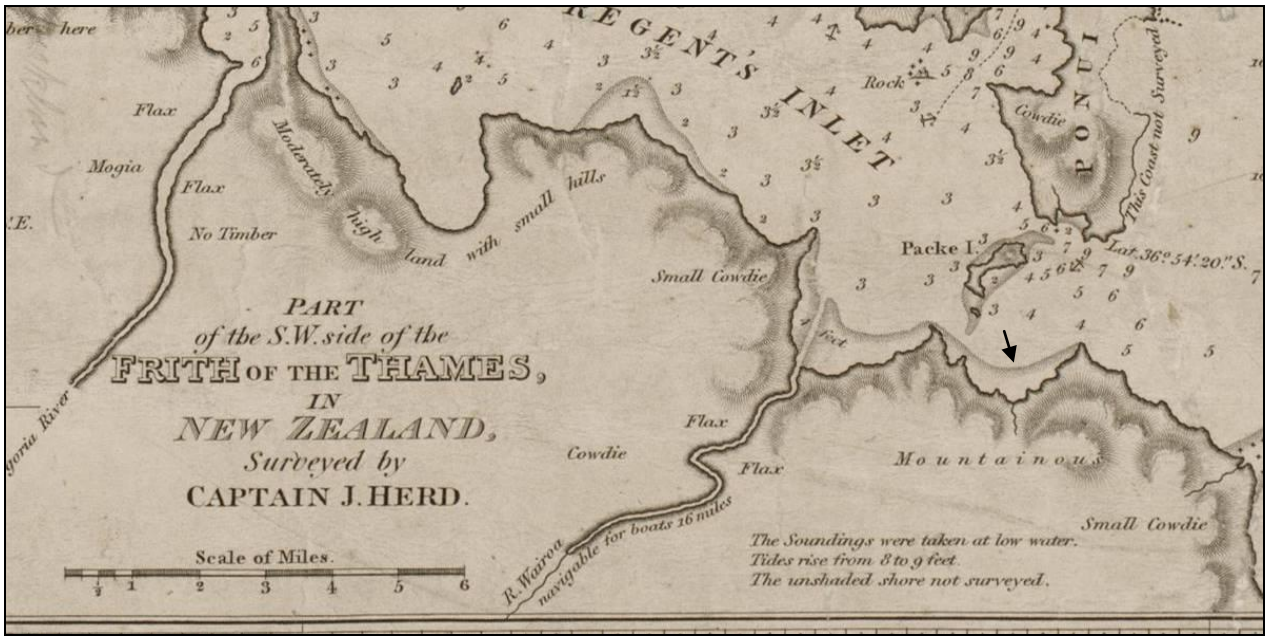

Figure 4. Inset from a chart of part of New South Wales, Van Diemens Land, New Zealand and adjacent islands, with the principal harbours, showing Kawakawa Bay in 1828 (http://natlib.govt.nz/records/22191236)

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Figure 5. Hydrographic Survey Map (MD 2148) 1849-1855, illustrating the recorded 19th century Maori villages Kawakawa and Taupo

Remnants of the Past

Swamp conditions in various locations have assisted the preservation of some of the wooden artefacts from the later Maori settlements (see e.g., Harlow et al. 2012) with gardening implements and canoe components recovered. This is despite relatively limited testing.

A range of colonial period artefacts have been recovered and continue to be regularly found in the inter-tidal zone of the Bay and during digging activities along the coast (Figure 6–Figure 7).

Farming, timber-felling and gum-digging became major activities, bringing a range of people into the Bay and resulting in the development of the settlement there.

Artefacts from farming activities including both 19th and 20th century material, have also been identified during archaeological excavations (see e.g., Harlow et al. 2012).

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Figure 6. Private collection of musket balls, bullets and other historic artefacts from Kawakawa Bay (photo by Barry Baquié 2014)

Figure 7. Buttons found in the inter-tidal zone including one from the 58th Regiment (private collection, photo by Barry Baquié 2014)

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Changes along the Coast

The coastal fringe around Kawakawa Bay is subject to significant tidal effects. Figure 8 shows how the mouth of the Rautawa Stream has changed since 1956, with the coastal road originally following Ferndale Drive inland and then looping back on the western side of the stream to the coast along Rautawa Place. Today, sufficient land reclamation and the bridge over the stream mean that the mouth of the stream is much narrower than in the recent past and the inland stream crossing is now a footbridge only.

Figure 8. Kawakawa Bay looking over project area in 2015 (top) and in 1956. Modern satellite Image, Google Earth 2015. 1956 Aerial: Kawakawa Bay, Auckland, includes housing, farmland, shoreline and roads. Ref: WA-40881-F. Alexander Turnbull Library, Wellington, New Zealand. http://natlib.govt.nz/records/30111804

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Previous Archaeological Research[2]

Archaeological sites began being formally recorded in 1969 and focused on the obvious sites such as headland pa (S11/75, S11/80 and S11/81 – see Figure 2). An archaeological investigation undertaken by Aileen Fox on the pa at Pawhetau Point (S11/75) in 1973 highlighted this pa site as "a major tribal centre, a hapu pa" (Fox 1974:20).

In 1975, Lorna Donovan surveyed the area from Waimangu Point on the western coast of the Firth of Thames to Kawakawa Bay, extending across 20 square miles. Donovan stated that the archaeological evidence indicated a closely settled area about Kawakawa Bay confined to the coastal lowlands, with some occupation along the backing ridges (Donovan 1976:14, 27). Midden sites were identified in a number of locations both along the coast and also eroding on some of the nearby slopes.

Little work appears to have been done in the 1980s and 1990s but in 2001 surveys by Coster (2001) and Clough and Tatton (2001) identified a few additional sites. Occasional artefacts have been exposed along the coast relating to Maori use of the area as noted above. Shell midden sites are evident along the coastal flats and indicate occupation sites, shellfish processing areas, camps or cooking areas. No garden sites have been archaeologically recorded. There are four gazetted urupa areas within the Bay (created by ML 8960, ML 13947, ML 9770).

Inland there are also several pit and terrace sites, mainly along ridge or spur lines. Harlow undertook some survey work in January 2002 prior to the planned harvesting of exotic crop trees. Along with subsequent work for the wastewater scheme (see below), some additional midden sites have been identified on high ground inland, but the sites are relatively small in scale, suggesting small campsites or perhaps temporary shelters in possible garden or bush resource gathering locations.

The only significant archaeological excavation that has occurred recently was by Plowman (2010b) at site S11/1066 after slips had cut off access to the Bay. The excavations were on middens located on the steep slopes of Turei Hill at the western end of the Bay. The middens were mostly crushed and fragmented cockle and pipi shell, but there were numerous other species represented along with fire cracked rock, charcoal and a small amount of fishbone. Plowman (2010b) indicated that the middens probably represented areas of refuse dumping directly related to primary shellfish processing and cooking. Two radiocarbon dates from the middens provided a date range of between the mid-17th and early 19th century for the activities identified at the site.

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[2] Adapted from Harlow et al. 2012.

Previous Archaeological Research, *continued*

Subsequent surveys and monitoring for the Kawakawa Wastewater Scheme by Harlow, Baquié and Bickler started in 2004, resulting in additional sites being identified (see Harlow et al. 2012) both along the coast and in the inland areas. Archaeological monitoring for the scheme was carried out under NZHPT Authority from July 2006 and continued intermittently until 2011. The trenches dug for the pipeline provided a small window showing the potential for archaeology in Kawakawa Bay. Additional survey work was required during the project to avoid some areas where burials were located near the coast. No major excavations were carried out, which limited the contextual information recovered, but there were a number of significant finds including:

- Recovery of a significant collection of wooden artefacts;
- Recovery of an adze and two hammerstones;
- Identification of small midden and earth ovens from a number of locations throughout the project area;
- Recovery of European artefacts reflecting post-1900 farming in the Bay;
- Uncovering of koiwi in front of 42 Kawakawa Bay Coast Road; and,
- Identification of a number of gum-digging sites in the inland forest areas.

The cache of wooden artefacts found in the swamp near the coast included a range of gardening implements and canoe parts, probably of 18th-19th century Maori manufacture at the Taupo Village. Given the small scale nature of the excavation, it seems probable there are many more objects preserved in the swamp.

Historic sites have also been identified in the area and include a maritime ballast site recorded by Mike Taylor and colleagues in 1983 in the western Kawakawa Bay. An old woolshed (Auckland Council Cultural Heritage Inventory (CHI) 1856) was recorded by Donovan (1976) where the 'Freshwater' woolshed was located on the foreshore. The McDonald Cottage was also recorded as one of the earliest European houses built in the area. It was built in 1860 but demolished in 1966 (Donovan 1976 Appendix 5). There may also be an unrecorded historic lime-works site reported by Henry Ashby (1961) located between Stoddart House and the foreshore, but has not been confirmed. Other sites found inland include some gum-digging sites worked by both Maori and Europeans.

No sites relating to the earliest period of Maori occupation have been identified at Kawakawa Bay, although proximity to "archaic" sites in the Hauraki Gulf leaves little doubt that the area was explored and used during this period. Later occupation is more visible. There are pa on the headlands at either end of the Bay, Pawhetau to the west and Te Whatu o Maru to the east, and several inland pa overlooking the valleys and the coastline.

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Urupa/Wahi Tapu

The other component of the archaeological landscape represented at Kawakawa Bay is the presence of four scheduled urupa along the coast. LINZ plans, ML8960, ML 13947, ML 9770, indicate the gazetted urupa in the bay. One area, Pawharangi (S11/1039), lies between Karaka Road and the western side of Te Karaka Stream. It was reported as a Burial Area site by Lorna Donovan in 1976.

The excavation of three exposures of koiwi tangata (human remains) in the vicinity of the urupa was reported on by Judith Littleton in 2006 after erosion exposed some of the remains along the foreshore. Littleton et al. (2006) describe two in situ burials with coffins and a third burial, which had been laid out in a row and regularly spaced with the heads of those in the coffins oriented to the west. Littleton et al. argued that the burials dated to the mid-1800s. Additional burials were found during the Kawakawa Bay Wastewater Project (Harlow et al. 2012) in trenching alongside Kawakawa Bay Road which may relate to the later 19th century, but more probably to the early 20th century.

The burial site of the famous Ngati Paoa chief Te Haupa, who commanded the Pawhetau headland Pa S11/75, was noted in the general vicinity but the exact location is not known (Harlow et al. 2012:24). As they discuss, a map related to coastal exploration by Downie in 1820 suggests that the burial site was some distance inland (Figure 10), but the details are sketchy.

Summary

Overall, the sites in Kawakawa Bay can be described as "typical of the Maori archaeological settlement pattern found along the Tamaki Straits coast and western coast of the Firth of Thames" (Tatton and Clough 2002:3), with pa sites on the headland spurs and evidence of other settlement in the areas between, with easy access to the rich marine resources along the coast.

Historic sites have also been identified and relate to European-era activities in the Bay. These include evidence of gum-digging in the interior behind the Bay. Other activities related to farming and lime works are known from published sources but have not been investigated archaeologically.

No direct evidence of earlier occupation of the area prior to the 17th-18th centuries has been secured archaeologically, but nevertheless earlier dates are likely. No archaeological evidence of gardening soils has been recorded but early plans show historic period cultivations in the Bay near the coast. Urupa occur in a number of locations near the foreshore.

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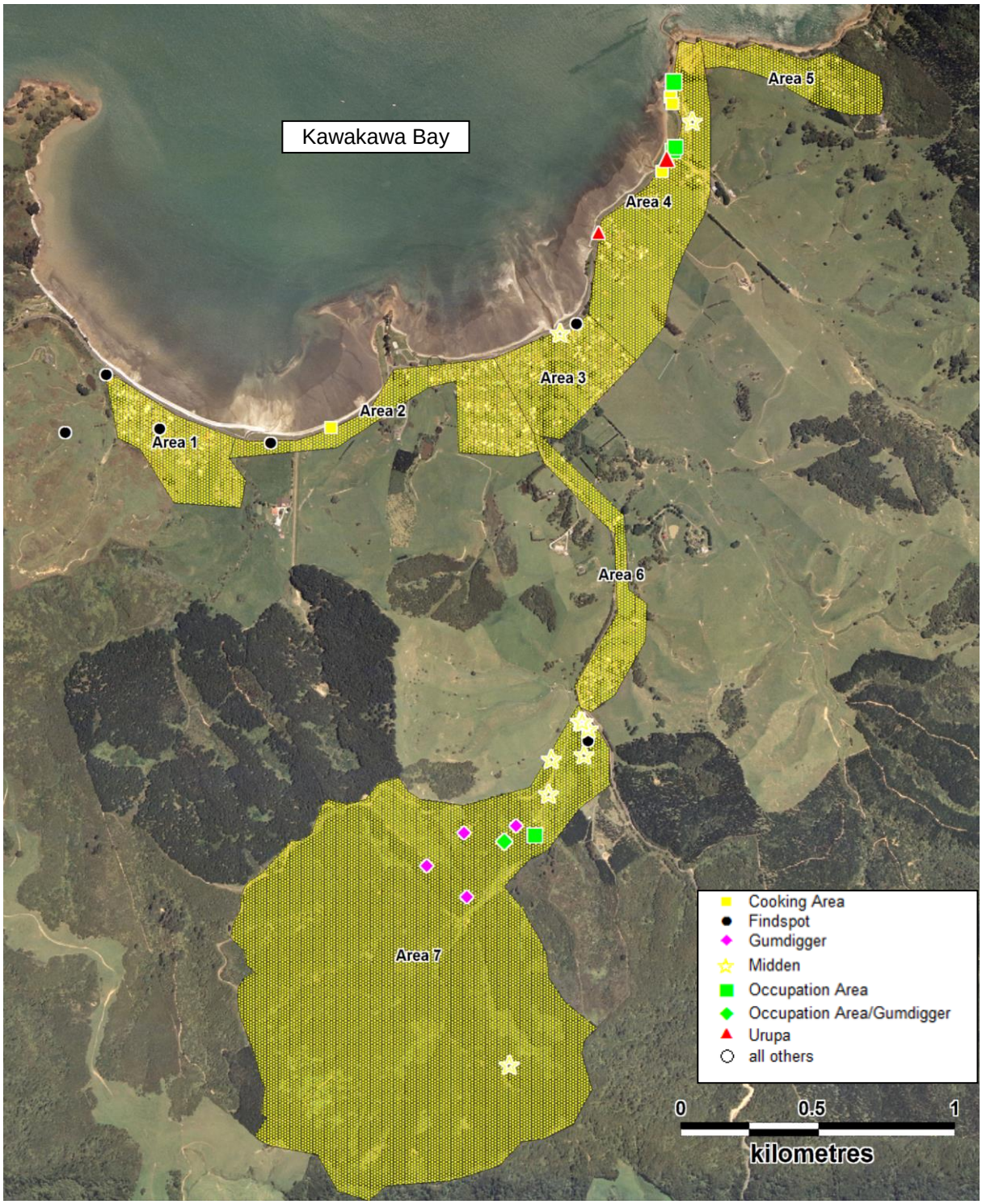

Figure 9. Map showing archaeological sites recorded by Harlow et al. (2012: Figure 163)

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BACKGROUND, CONTINUED

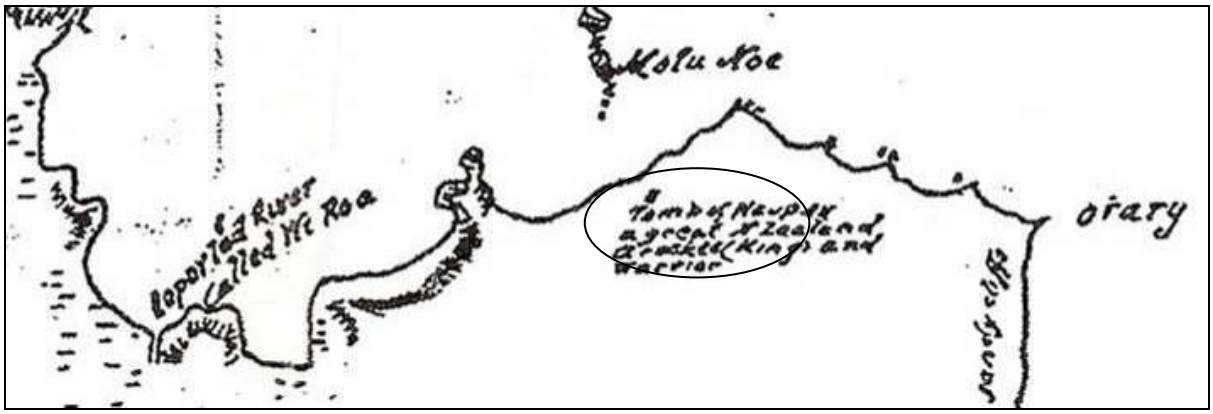

Figure 10. "Sketch of the River Thames in New Zealand Showing the Coast Explored in HMSS *Coromandel*. By J. Downie Capt." [Portion]. Map caption: "Tomb of Haupa [Te Haupa] a great N Zealand ar..kee [ariki] (king) and warrior"

Recorded Site S11/1083

Archaeological site S11/1083 was recorded during monitoring of works for the Kawakawa Bay Wastewater Scheme (Harlow et al. 2012:47, Figure 3). The site was described as extending the length of the trenched sewer line between #14 Kawakawa Bay Coast Road (E1793455 N5908820), across Ferndale Drive and to the eastern bank of the Rautawa Stream (E1793346 N5908752) (Figure 11).

The site consisted of shell midden with other material such as obsidian and hangi stone visible in the wastewater trench section (Figure 12). The southern baulk showed the remains of a fire scoop, and it was from this feature that archaeological remains were recovered during the sieving process following machine excavation. The fire scoop measured 1550mm long and was 300mm thick, and was within the broad scattered cultural layer noted along most of the foreshore trenching. It contained cooking stones, broken and whole cockle (*Austrovenus stutchburyi*) and pipi (*Paphies australis*) shells in a greasy charcoal-stained sandy matrix. The modern roading sub-grade and the thin bitumen road surface capped it off while a thick deposit of natural beach sand was present below (Figure 13). The trenching across the roadway was up to 1500mm deep (Harlow et al. 2012:51-52).

That trench was located around 2-3m south of the proposed stormwater trench described in this report, in the area of the road, and running in roughly the same orientation. No indications of any burials or coffins were identified during that work in the area.

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Figure 11. Showing location of the sewer trenching line from 14 Kawakawa Bay Coast Road to #2 Ferndale Drive and across Ferndale Drive to the bank of the Rautawa Stream, in which midden site S11/1083 was exposed (Auckland Council GIS Viewer)

Figure 12. View of wastewater trench (Harlow et al. 2012: Figure 63) across Ferndale Drive showing previous roading other material above natural beach deposit

Figure 13. Trench profile across Ferndale Drive showing firescoop (Harlow et al. 2012: Figure 64)

Part 2: Results

INTRODUCTION

Project Overview

Initial trenching from the Rautawa Stream across Ferndale Drive to the east was started in March 2014 (Figure 3, Figure 14). After initial indications that human remains and coffins might be present under Ferndale Drive, a revised strategy for the project excavations was agreed upon. This included:

Ferndale Drive

1) Excavation of the Ferndale Drive trench to determine the extent of the area of potential burials;
2) Expansion of the excavation area under Ferndale Drive to allow full excavation of burials and movement of them to a new burial location in a designated urupa;

Pipeline Excavation

3) Monitoring of stripping in the berm to the east of Ferndale Drive;
4) Monitoring of trenching in the area of the berm;
5) Monitoring of other areas such as the Rautawa Stream where works were undertaken for the project.

Excavation of the burials involved recovery of all remains possible and the archaeological team was assisted by representatives from Ngati Paoa and Ngai Tai ki Tamaki.

Arefacts including coffin furniture were also recovered from the burials.

All material was stored on-site in locked containers. These containers also allowed for processing and analysis of the archaeological samples on site. Artefacts associated with burials were kept with the burials and reburied in the urupa, following the end of the project.

Trenching in the berm was monitored by the archaeologists and iwi representatives. Midden and other samples were collected for analysis and are described in detail below.

Figure 14. View of trench across Ferndale Drive

Ferndale Drive Excavation

INITIAL EXCAVATION

Ferndale Drive Trench

Trenching (Figure 14) from the Rautawa Stream was undertaken following the setup of the project works. The works were monitored and towards the eastern half of Ferndale Drive under the asphalt, fragmentary bone was identified. Works were stopped and stakeholders were notified following the find.

The fragmentary remains were uncovered and, with the assistance of the iwi representatives from Ngati Paoa and Ngai Tai ki Tamaki, the surrounding soils were sieved to ensure as complete a recovery as possible was made. A coffin burial (B1) along with other human remains (B7) was also found in the southern section of the trench.

The human remains were located under both an old road surface and a dense shell/sandy matrix at a depth of around 1.2m (Figure 15, Figure 16). Subsequent tidal flooding and upwash of sand was visible in the centre of the trench and explained the poor condition of material there (Figure 16, Figure 15).

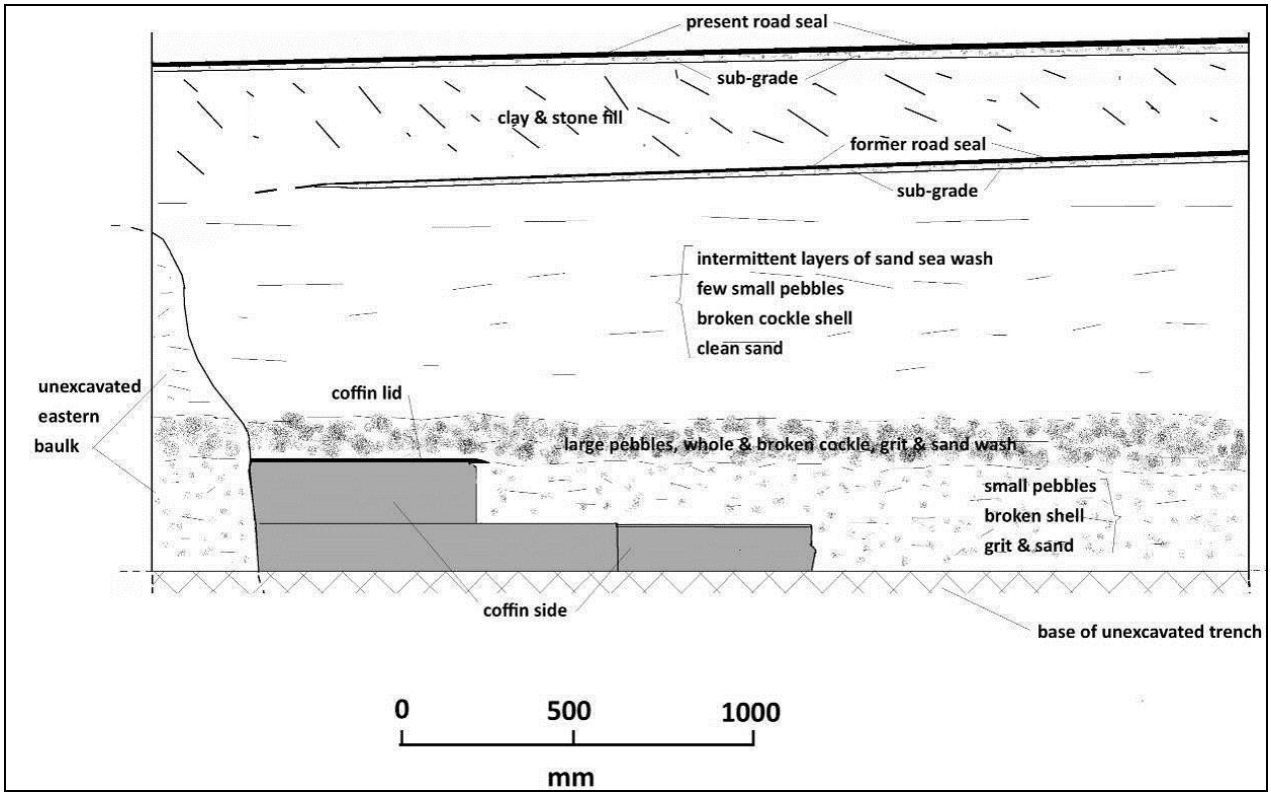

Figure 15. Southern baulk of trench showing B1 in section

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INITIAL EXCAVATION, CONTINUED

Figure 16. Stratigraphy (south section) above Burial 1 prior to areal excavation

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Burial 2

It was apparent that there were a large number of bones within the main trench and so the soil was sieved completely to maximise recovery. However, the large number of bones did suggest that there were a number of individuals represented and the visible B1 coffin appeared to be sufficiently intact to indicate that it was not the source of the bones.

Some decayed metal staining was visible in the soil in the centre of the trench at the eastern end. Excavation revealed additional bones and eventually the fragmentary remains of another badly decayed coffin (Figure 17).

The coffin was aligned roughly east to west within the trench, but only the eastern end was still intact, with the tidal wash having destroyed the rest of the coffin. It was not clear whether the bones recovered had been buried originally in the coffin, but given the large number of individuals identified (12) following osteological analysis, this seemed unlikely. More probably the coffin was placed in a hole with a number of other individuals buried either alongside or on top of the coffin.

The shape of the coffin was also not clear (Figure 17). It appeared that it was the foot of the coffin that remained intact rather than the head, with the side fragments appearing to be perpendicular. This suggested that the coffin had been rectangular rather than the hexagonal shape of the neighbouring B1 coffin.

While the initial trench was dug with a digger and resulted in mixing of the bones, the base of the original trench did not go as deep as the coffin remnants and some of the bone fragments recovered, which were still around 10cm below the trench cut. The repeated years of tidal movement had damaged the integrity of the coffin and mixed the individual remains (Figure 17, Figure 18).

There were at least 12 people (Burials 2a-i) represented by this group of broken and co-mingled remains. These included:

- 6 adults (1 female, 2 males, and 3 adults of unknown sex);
- 1 adolescent; 2 children; and
- 3 infants.

The majority of the bones were stained dark brown, suggesting that they had been either within or next to the remnant coffin.

One shilling dating to 1864 (Artefact #60), one drilled shark tooth pendant (Artefact #55) and a piece of worked bone (Artefact #54) were also found among the remains. These were all assigned to ‘B2’, though their precise association with any of the individuals was not able to be determined.

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INITIAL EXCAVATION, CONTINUED

Figure 17. Remains of coffin (B2) in centre of trench

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INITIAL EXCAVATION, CONTINUED

Figure 18. East section in trench near Burial 2 (trench depth 1.4m)

EXPANDING THE EXCAVATION

GPR Results

Ground Penetrating Radar (GPR) was undertaken by Geotechnics Ltd around the area of the coffin burials using the signal of the intact coffin in the side of the trench as a baseline for subsequent burials. GPR was also undertaken along the remaining route of the stormwater trench to determine the likelihood of further burials there (Figure 19).

The results suggested that another six burial areas might be under the road or in the way of the proposed trench. Subsequent GPR work over a wider area undertaken on 17 March 2014 indicated that two additional burials might be adjacent to the previously identified coffins in the north (Figure 20).

Revised Methodology

The majority of these coffins were under the road reserve or would be disturbed by the proposed earthworks. It was decided that the coffins should be moved to another urupa nearby. A methodology for the removal of the remaining coffins was requested by all parties to allow the appropriate processes to be documented and to allow iwi to carry out appropriate tikanga in accordance with their kaitiakitanga obligations. This was approved and the work was undertaken by the team following the agreed protocols.

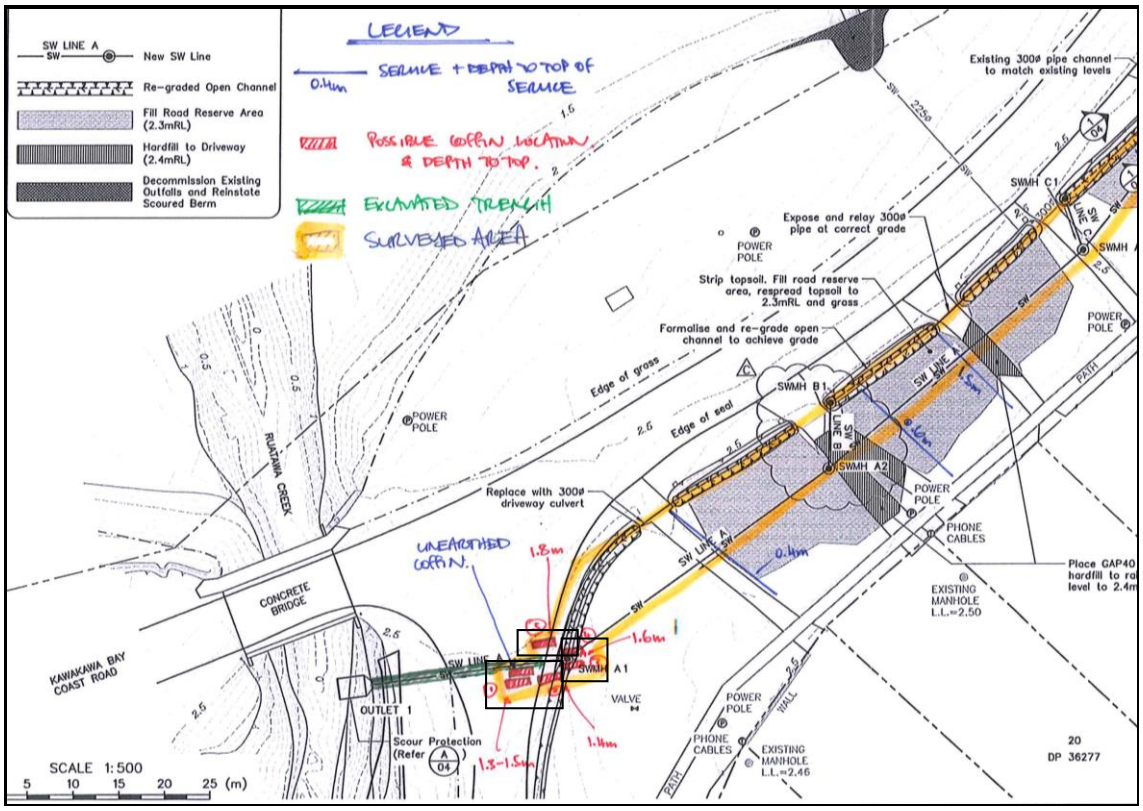

Figure 19. GPR results showing probable location of burials (courtesy Geotechnics Ltd)

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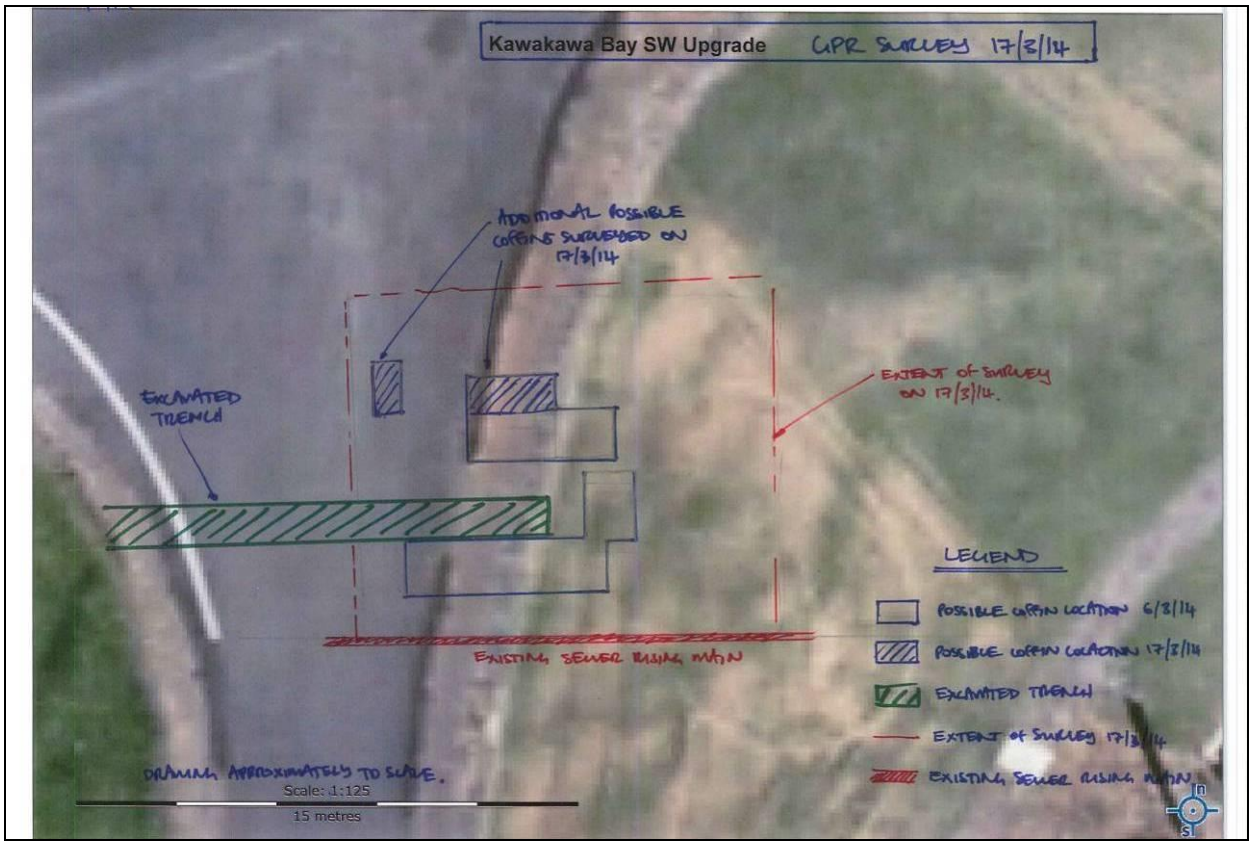

Figure 20. GPR results showing additional coffins identified on 17 March 2014 (courtesy Geotechnics Ltd)

Protocols

The area was screened from public view with appropriate safety measures (Figure 21), and made secure overnight. The protocols for excavation were then agreed upon:

1. Soil from the around the skeletons was sieved carefully (Figure 22) to ensure that all bone, other structures (e.g. calcified material such as kidney stones etc.) and any items such as buttons or other objects buried with the individuals were recovered.
2. The archaeology of the graves, the nature of the coffins and the position of the skeletons and any associated items were recorded (including photography and drawings) so that the burial practices were documented.
3. The remains were then carefully lifted from the grave and removed to a temporary on-site secure container.
4. Once in the holding facility, the remains of each individual were gently cleaned and carefully examined and recorded by a trained specialist (B. Hudson) with assistants.
5. Burial goods were photographed and described.

Continued on next page

EXPANDING THE EXCAVATION, CONTINUED

Figure 21. Screening of excavation

Figure 22. Simon Best sieving material around koiwi

Continued on next page

EXPANDING THE EXCAVATION, CONTINUED

Other Areas

With the GPR results marked out on the road (Figure 23), it was possible to extend the excavation, initially to the south to pick up the coffin associated with B1 and the other koiwi observed in the first trench.

The eventual distribution and depths of burials are shown Figure 24–Figure 26.

While detailed excavation of the southern burials was being undertaken a digger was using to extend to the north and three coffin burials (B4-B6) were identified there. Additional burials were identified west of those as the area was expanded and included the burials associated with B8 and B3.

Trenching along the stormwater alignment was undertaken to the east and although initially there did not appear to be any sign of burials there, the coffin B9 was identified and subsequently excavated.

Once those burials were removed, trenching continued to the east but no additional burials were identified.

Figure 23. Areas of interest identified by GPR marked out in white paint

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EXPANDING THE EXCAVATION, CONTINUED

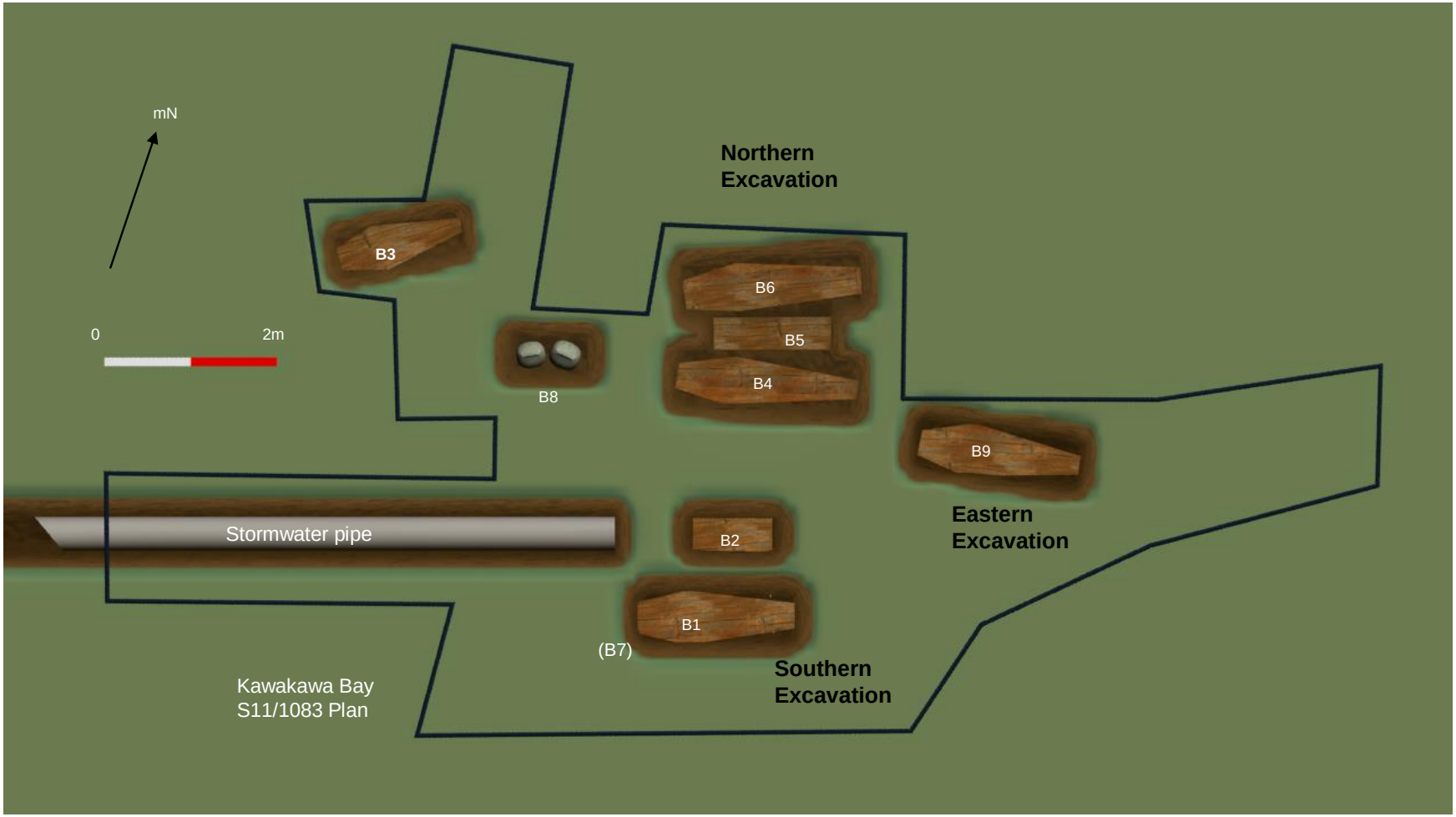

Figure 24. Distribution of coffins and burials (simplified 3D model to show general plan)

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EXPANDING THE EXCAVATION, *CONTINUED*

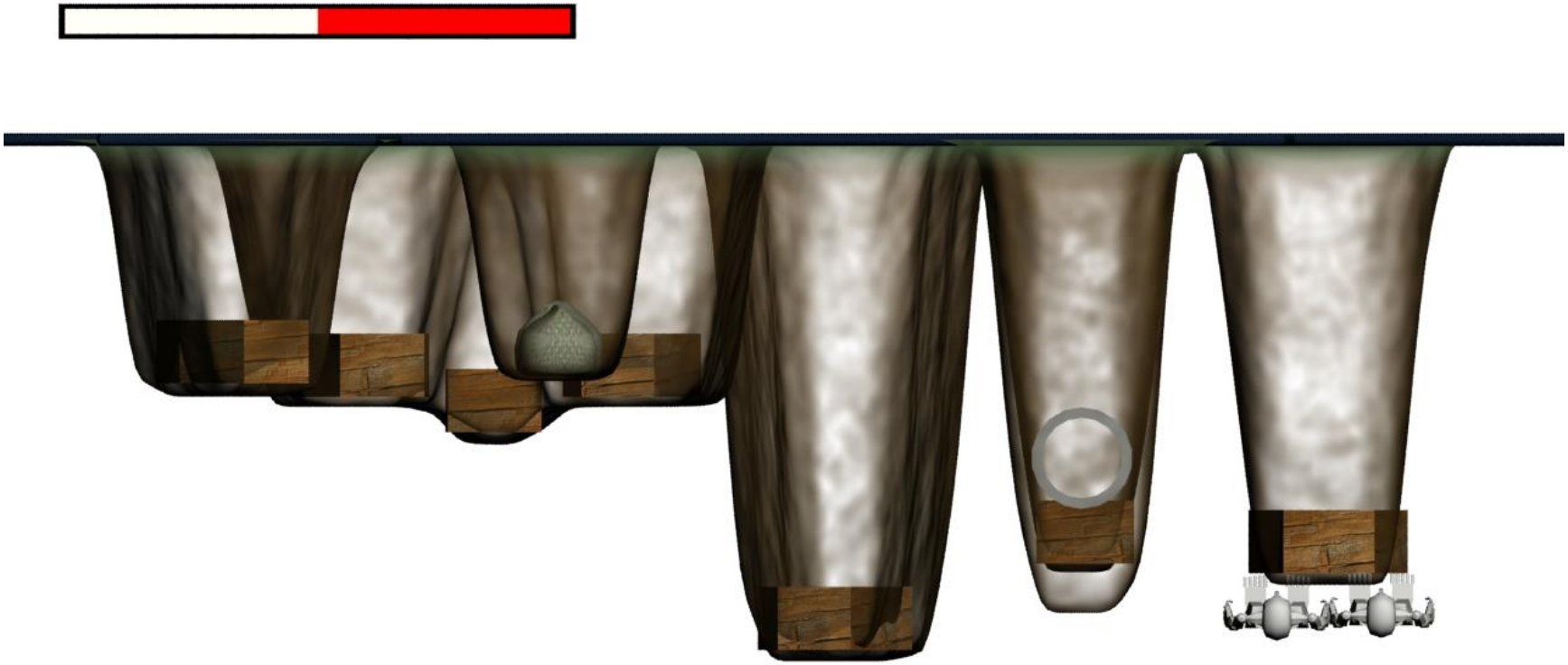

Figure 25. 3D model showing depth of graves looking from west to east (skeletons are representative only)

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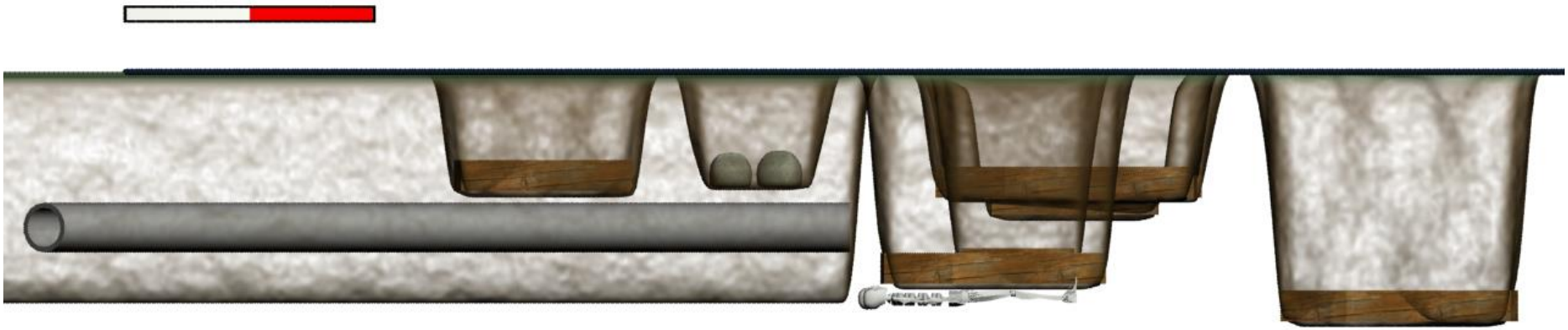

Figure 26. 3D model showing depth of graves looking from south to north (skeletons are representative only)

SOUTHERN AREA

Burial 1

The north side of the Burial 1 coffin had been exposed in the stormwater trench (Figure 16) and a number of other skeletal remains were exposed at the western end beside the coffin, although in section it was considered possible that those burials may have been within the B1 coffin. This proved not to be the case once the rest of the coffin was excavated south of the original trench. A large rectangular grave cut was visible immediately under the base course for the road (approx. 500mm below the road surface). The pale brown sandy grave fill clearly contrasted the natural coarse sandy subsoil (Figure 27). A thin band of fine, grey silty soil also existed in patches beneath the base course, though it was unclear whether the grave cut was beneath or cut through that layer. The large grave cut measured 2.6m long by 0.8m wide and the base of the grave was 2.6m below the level of the modern road surface. Within it was the large, solid and very well-preserved coffin of Burial 1 (Figure 28–Figure 31).

The burial was within the water table, which is likely to have contributed to the preservation of the wood, which remained in thick planks that were able to be removed whole.

No name plate or other metal fittings were recovered from the lid though a large piece of corroded metal was located at the head end of the coffin. Additional details of the coffin are provided below in Part 4.

The main burial in the coffin was an adult male lying on his back in the extended position with the head oriented to the west. The hands rested by his sides with the left palm-up and the right palm-down. The coffin had plenty of room around the remains and appeared large by comparison with the smaller coffins found elsewhere on the site (see below). There was over 100mm excess coffin space around the shoulders and at the feet the coffin was 470mm wide, much wider than many of the other coffins, and this had allowed the feet to move apart from each other. There is evidence based on the skeletal remains discussed in Hudson (2015) to suggest that this individual was a very robust and possibly corpulent individual.

The sides of the coffin were tongue and groove, which may give an indication of its likely maximum age. Such boards are first advertised in Australian papers in 1851 (*Geelong Advertiser* 8 October 1851:2), and in Auckland were used as wallboards in Dr Pollen's house in Avondale behind wallpaper with a design registration mark dated to April 1851 (held by Simon Best).

Removal of the Coffin

The removal of the B1 coffin exposed a number of other skeletons predominantly under the coffin but with their skulls exposed in the main burial shaft (Figure 32). These were collectively described as B7, although clearly consisting of more than one individual, as they were probably buried together.

Continued on next page

Burial 7

When the large timber base of the coffin for B1 was lifted, a dense scatter of human bone from multiple individuals was found directly beneath it. The scattered bone was sitting on the base of, and was confined within, the large rectangular grave cut that had been made for the B1 grave. There had been no soil build-up between the deposition of the scattered bone and the placement of the coffin in the grave: the coffin had been placed directly on the bone and many bones were embedded in the coffin wood and partially crushed by the weight of the coffin.

Bones that were beyond the head of the coffin were stacked high at the western end of the grave and gave the impression of having been tipped or scattered in from here. Three complete adult skulls sat highest in the pile, having been placed or dropped into the grave last. There was no apparent arrangement or order to the bones and the three skulls faced in different directions, with two face-down and one on its side. The bones were completely disarticulated and there was no evidence of any soft tissue having been present when the bones were placed here. There was no indication of them having been constrained by being wrapped in basketry or matting, such as found for B8. Infant bones were found throughout the scatter, intermingled with the adult bones. The bones were all stained dark brown, as for B1, presumably due to tannins in the coffin wood and/or other aspects of the burial environment.

There were several artefacts among this scatter of bones. These included:

- A sheep's knuckle bone (Artefact #42);
- A small piece of tubular metal fitting (Artefact #39);
- Three corroded items of unknown material and purpose (Artefact ## 40, 45, 46);
- A corroded piece of metal that, when radiographed, appeared to be a lock plate (Artefact #48); and
- A nail, small flakes of metal sheeting and some fish bone (Artefact ##43, 74 and 49 respectively).

More personal items found were:

- A small ceramic toothpaste or cosmetic jar (Artefact #38) and its lid; and
- A button made of horn or bone (Artefact #47).

One other item stood out as both of value and of a personal nature. This was found in the east end up against the grave cut and consisted of a small tin (Artefact #37) filled with a collection of silver coins from France, Bolivia, Mexico and Britain. The artefacts are described in detail below.

Continued on next page

SOUTHERN AREA, CONTINUED

Figure 27. Grave cut for Burial 1 being exposed by the excavator showing coffin outline

Continued on next page

Figure 28. Coffin after removal of bones

Figure 29. Bottom end of coffin (B1) showing nails (inset)

Continued on next page

Figure 30. B1 coffin (2m long)

Figure 31. Tongue and groove in side panel

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Figure 32. Empty grave cut once excavation completed

NORTHERN AREA

Excavation

The main area to the north of the main trench was opened using a digger under careful supervision. Two trenches were originally excavated here, with one to the west and one directly north of original trench The outlines of three coffins (Burials 4, 5 and 6) were found at a depth of around 80cm and these were excavated.

Burials 4, 5 and 6 were located on the north side of the pipeline, to the east of Burials 3 and 8. They were buried very close to each other and on a similar, though not quite parallel, alignment with the heads oriented to the west.

Burial 3

Burial 3 was located to the north of the pipe trench (Figure 33). A black, richly charcoal-stained cultural deposit was identified beneath the road asphalt and natural tidal layers below (Figure 34). Several small features (some circular and linear scoops) were identified, but their function could not be established. Some were found in both the north and west baulks around and above Burial 3 and suggested that some activity continued towards the stream bank.

The outline of the Burial 3 coffin appeared around 75cm below the road surface and was oriented with the head around WSW, putting it on a different angle to the coffins found nearby (Figure 35). The grave cut for Burial 3 was visible where the dark mottled grey sand fill contrasted with the natural pale sandy substrate (Figure 36).

At the head end of the coffin the base boards had been forced upwards at an angle of 24 degrees, leaving the head higher than the rest of the body. While being lowered the rope at that end may have slipped or broken, causing the coffin to spear into the grave. The coffin measured 187cm long, 40cm wide across the hip area and 24cm wide at the feet. The outline of the walls was visible where wood had decomposed, leaving powdery brown soil and occasional small wood pieces. Several iron nails were recovered from the grave. Three of these were evenly spaced along the head-end wall of the coffin.

No coffin lid was recovered but the boards of the base were partly preserved and were visible beneath the remains. Small pieces of thin metal sheeting were recovered from places along the side of the grave cut. One of these was recovered from by the right humerus.

The skeleton was identified as an older woman, estimated to be in her 50s or older. The skeleton lay on its back, stretched out with hands lying by its sides, right hand palm-down and left hand palm-up. The coffin fitted very tightly around the skeleton, with no excess room.

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Burial 3, *continued*

This person had been buried in clothing or a shroud that buttoned over the chest. Three white milk-glass buttons were found: one on the right lower ribs, one on the right upper ribs and one sitting at the base of the neck (Artefact #13). She was also buried wearing a pounamu (greenstone) pendant that lay on the base of the coffin, by the left ear (Artefact #14, Figure 37). While this was almost certainly a kuru or ear pendant, it could also have been worn around the neck, ending up in its final position from the impact of the coffin as it tipped into the grave, sending it over her shoulder.

Burial 8

Another burial area was discovered when clearing to the south-east of Burial 3 for access. The grave was not as obvious as the nearby coffin areas and it was only when bones were uncovered that the burial was identified, with some minor disturbance to the western burial.

The grave fill included pale mixed grey sand (Figure 38), which may due to the fact that there was no coffin and therefore no decomposing timber.

The grave cut proved to be rectangular in plan and oriented east-west, as were most others at the site. It was cut from the same level as other graves and so could be made out immediately beneath the former road base course layers. It measured approximately 0.9m long, was 0.4m wide and its sides tapered in slightly towards the flat base.

At the base of the rectangular grave were two round bundles of bone. These contained only the bones of young children and infants. The tight, stacked and distinctly circular bundles of bone show that the bones had been restrained by some material that was not preserved.

The bones appear to have been placed in two separate baskets or bundles of fabric that were sat side by side. The eastern bundle (B8 East) measured 38cm x 40cm. The base of the western group (B8 West) was intact, covering an area around 25cm in diameter. Bones that had been disturbed from the top of the bundle were recovered by sieving the digger spoil.

It seemed likely that these were secondary burials, with the bodies originally deposited elsewhere until the soft tissue no longer held the bones together. The disarticulated bones were then gathered together to be buried in bundles within the rectangular grave.

This combination of secondary burial in a rectangular grave that was oriented on the same axis as other coffin burials at the site appears to be indicative of transition between pre-contact Maori burial traditions and the clearly Christian-influenced traditions of the coffin burials nearby.

Continued on next page

Figure 33. Trench for Burial 3 being excavated

Figure 34. Western baulk of trench for B3 showing black layer below old asphalt

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Figure 35. Outline of coffin for B3 (top: looking down, north is top; bottom looking west)

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Figure 36. South-facing profile of the grave cut of Burial 3 (indicated with dashed line), showing it cutting through the dark layer (arrow) on an angle. A small scoop feature of unknown purpose is adjacent to it

Figure 37. Burial 3: the pounamu pendant was discovered once the skull had already been removed, located in the area of the left ear. Scale units 1cm

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Burial 8, *continued*

A perforated shark's tooth ear or neck pendant (Artefact #50) was found near the base of B8 East. It had a coating of a bright red greasy, waxy substance, which was likely to have been sealing wax as noted on other shark tooth pendants,[3] and this had stained some of the bones around the item. Again there is a mixture of traditional values and European influence represented by this item.

There was a small point of green copper staining on some of the upper bones of Burial 8 East. No copper or brass items or nails were in the grave, though this staining was very similar to the copper staining on the bones of Burial 4, where the coffin had contained small brass nails.

Similarly there was a point of iron staining on the mandible in Burial 8 West, though no iron items were recovered. These points give a hint of what the bones came into contact with in their place of primary deposition. They may have been placed in a coffin or some kind of container that used brass and iron in its construction. If they were placed in a coffin or wooden container, this would help to explain how all the very smallest of the bones, even the phalanges of a pre-term infant, could be collected for secondary burial.

Burial 8 West

This bundle contained the disarticulated bones of two young individuals: a child (B8 West *a*) of about 4 to 5 years of age and the very tiny bones of one pre-term baby (B8 West *b*) of about 36 weeks in utero, who was likely to have been born prematurely and did not survive.

The majority of the child's bones were present. This child had only very mild dental wear and one cavity in the deciduous (i.e. milk teeth) right molar. The first permanent molar had two grooves where enamel formation had been halted by bodily stress when the child was between the ages of about 18 months to 3 years. This child had therefore suffered a period of illness in its infancy but had survived the episode to go on and live for another one to two years. The weakened enamel in the groove had left the tooth vulnerable to decay and had begun to be eroded by a small cavity.

The remains of the premature infant B8 West *b* were mostly complete as well, including many of the smaller finger and foot bones. It is possible that the loss of some bones occurred prior to secondary burial, but the bones were generally in good condition.

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[3] For example, one in Te Papa – http://collections.tepapa.govt.nz/object/191234

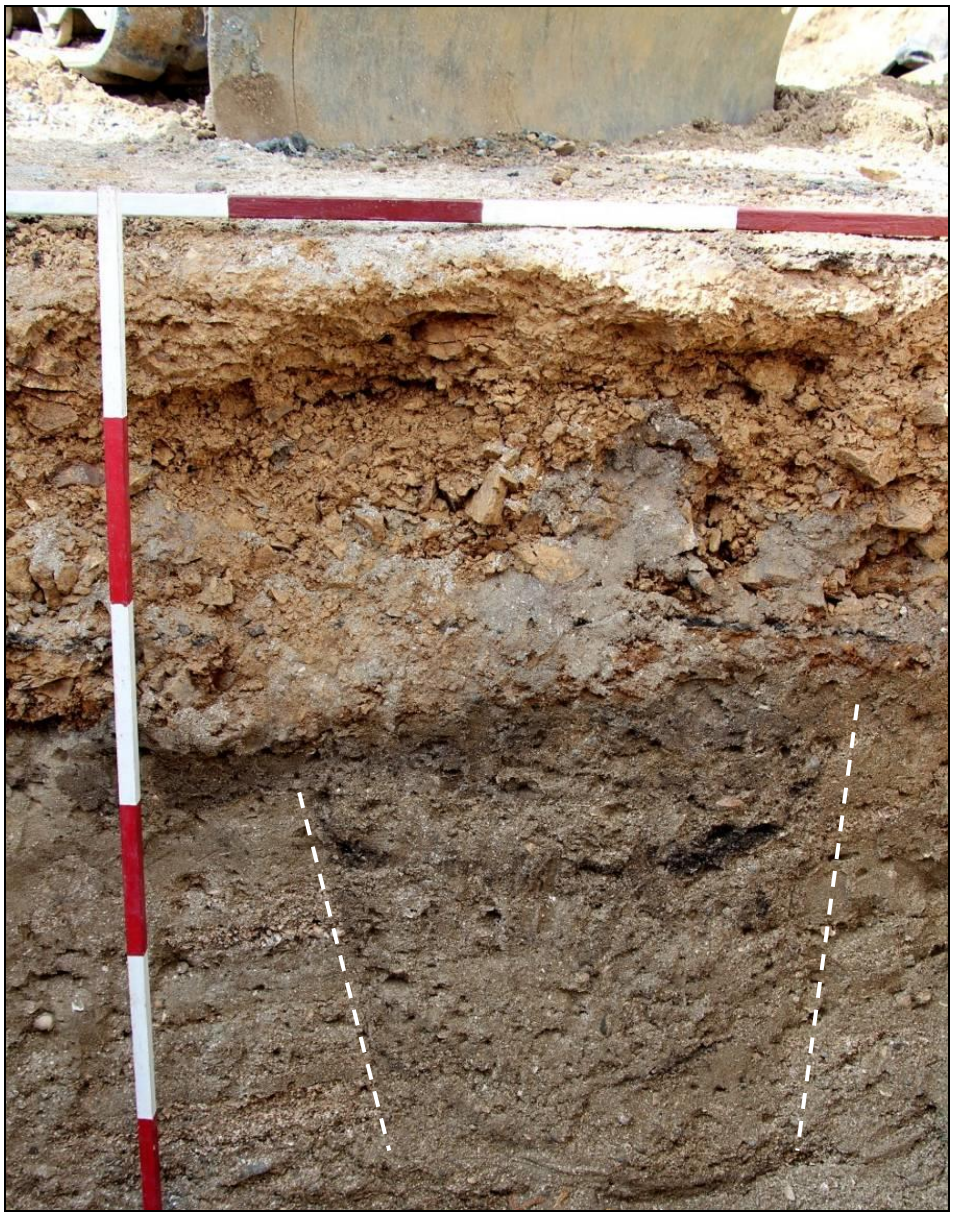

Figure 38. The profile of the Burial 8 grave cut visible in the excavation baulk. Bones were exposed at the base of this

Burial 8 East

This tightly stacked bundle of bones contained five young individuals: one child of about 5 years (B8 East *a*); two babies of 6-9 months (B8 East *b* and *c*); one baby of birth to two months old (B8 East *d*) and a few additional bones of another small baby (probable newborn, B8 East *e*). The majority of the bones related to four individuals (*a–d),* for whom the skeletons were near complete. Individual *e* was represented only by a few fragile long bones and the portions of the temporal bones of the skull. The long bones of this little baby were notably more degraded in condition than the others in the group.

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Burial 4

Burial 4's coffin outline was visible as a thin stain in the soil where the wood had decomposed, though occasional pieces were preserved. It was hexagonal and tightly tapered to the feet. No coffin lid was distinguished, though some of the nails found among the skeletal remains may have come from the lid, particularly one nail found in the right scapula (shoulder blade).

Three iron nails were closely and evenly spaced alongside the right forearm, which appeared to have been driven in perpendicular to the coffin wall. Closely spaced nails were found at the head board of the coffin. Nails were also found under the spine, where they may have served to secure the boards of the base together. Brass tacks were found in the wood of the coffin walls and may have attached lining to the inside or outside. Green copper corrosion staining on the upper surface of the lower vertebrae suggested that these brass nails were also used in the coffin lid.

The coffin was very narrow, allowed no extra room beyond the head or feet and was approximately 175cm long. It measured 41cm at the widest point, 35cm at the head and about 20cm wide by the feet.

This person lay extended, on their back with the head pointing to the west but facing to the south where the skull rested against the south wall of the coffin. The right hand was under the right hip and the left hand was on its side propped up between the left hip and the coffin wall. The feet had been together and the steeply angled clavicles (collar bones) again showed that the body had been hunched to fit in the narrow coffin.

No other items were buried with this person and there were no buttons or fastenings to give evidence of any clothing they may have been buried in.

Burial 5

Burial 5 was a rectangular grave cut filled with dark sandy material. The grave cut itself measured approximately 1.3m long and 0.4m wide. The small coffin was not well preserved and the coffin walls and lid were not distinguished in most places. Remnants of the timbers of the base of the coffin survived beneath a child's skeleton. The child had lain extended on its back with the head facing directly upwards. Remnant coffin timbers from the foot board were partially preserved and oriented with the grain of the timber running in an upwards direction.

One shell button (Artefact #77) was found when removing remnants of coffin timbers from the head board. The button appeared to be sticking to the outside of the coffin, which would suggest it was either an incidental find in the grave fill or related to material around the outside of the coffin rather than associated with the child's remains.

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Burial 6

Burial 6 was laid out alongside Burials 4 and 5, on the north side of the stormwater trench. This was another hexagonal coffin burial in which the individual was laid on their back with the head to the west. The coffin was hexagonal and the outline of its thin walls can be clearly seen in Figure 39–Figure 41.

It was slightly better preserved than that of nearby Burial 4, though the wood was still essentially a stain with occasional remnants of timber. The coffin measured 191cm from end to end and was 41cm at its widest point. The proximity of the edge of the Burial 6 coffin to the grave cut of Burial 5 (c.20cm) suggests that the grave cut of Burial 6 could have intercut with that of Burial 5.

It seems likely that there was no significant period between any of these three burials.

The skeleton was that of a middle aged man. This person's arms were laid by their sides with both hands palm-down and their feet together in the narrow coffin end. The coffin had allowed enough space for the body, though not with excess room. The head had rolled to lie against the south side of the coffin and faced to the south-east.

This person had been buried with two pounamu pendants:

- Artefact #21 found on the coffin base by the right side of the skull, and
- Artefact #27 found under the right side of the mandible.

Both were broadly similar pendants, although Artefact #21 was fatter.

There is little doubt that these are kuru or ear pendants. Portraits of individuals from the 19th century – chiefs or their relatives – show similar pendants worn in both ears[4] and suggest that this man was of high status.

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[4] See Knight 2013: plate A3; and an Angas watercolour in the South Australia Musuem (archives.samuseum.sa.gov.au/aa8/AA8-07.htm)

NORTHERN AREA, CONTINUED

Figure 39. Northern area of coffins prior to excavation (top: overview; bottom: close-up of coffin outlines)

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Figure 40. Remnants of coffin in Burial 5 (bottom centre) with outline of burial 6 coffin above

Figure 41. Northern area of coffin burials after excavation

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EASTERN EXCAVATION

Burial 9

This burial was the easternmost in the group and was located slightly to the north of the path of the stormwater trench. This area was not covered by the road seal as the rest of the burials had been, and fine roots reached deep into the area of the grave and had grown through remains of the coffins causing erosion in the bone surfaces. This was despite the burial being at a depth of 1.3m below the ground surface and level of the turf.

The grave cut for this coffin was rectangular and only very slightly larger than the coffin itself. The grave fill was grey coarse sand and the fill of the coffin was essentially the same, but with a darker and more organic soil component. The coffin measured 1.8m long and was at least 30cm wide at the feet (this end had been slightly truncated by excavation to clear the trench path) and was 43cm wide at the widest point across the body. Burial 9 was above the level of the water table and the wood was preserved better than in those coffins that were buried at shallower depth (e.g. B3, B4, B6), but was not as well preserved as the deep Burial 1 and the sides were difficult to define in some places. The coffin appeared to be a hexagonal shape.

This person, a middle aged man, was buried on their back with both hands by their sides palm-down. The head was oriented to the west. The cranium had disarticulated from the mandible and rolled to face the north, though this did not appear to be deliberate placing. The feet were wide apart and there was more room at the foot end of this coffin than in several others. Most of the bones were articulated, though some disarticulation at the feet indicates that this part of the body at least had begun decomposition in a void and had fallen apart with gravity. In this case, disarticulation of the feet was not an example of disturbance to the grave.

A single bone button (Artefact #65) was found in the grave, but as it was recovered by sieving its exact position was unknown. It came from somewhere in the torso region and may represent a simple shirt or shroud that this person was buried in.

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Figure 42. Area of coffin for B9 after excavation

RESTORATION

Road Restoration

Following the removal of the koiwi, the area of the main trench was removed and the Ferndale Drive asphalt was reinstated (Figure 43). While the removal of the koiwi was as comprehensive as possible to ensure that the tupuna were moved to the urupa, it is difficult to assess whether any other coffins would still be present in this vicinity. It is still possible that more burials could be found on either side of the stream near its mouth.

Figure 43. Restoration of pipeline trench across Ferndale Drive

Pipeline Excavation

TRENCHING

Summary of Pipeline Excavation

Excavation of the berm/road reserve area was carried out using a mechanical excavation machine with a 1.5m wide weed bucket, this initial topsoil stripping being carried out ahead of the stormwater pipeline trenching. The berm/reserve area in front of the residential homes required upgrading with surface fill following completion of the pipeline trenching to aid in the prevention of surface flooding.

Selected driveways also required hard fill to raise their levels above the lower reserve areas in between driveways (Figure 44). It was during the topsoil removal that archaeological features were revealed and subsequently recorded ahead of trenching works.

Following topsoil stripping, trench excavation, stormwater pipe and manhole installation, the road reserve was reinstated and re-landscaped. This also included re-forming the open channel between the main road seal and the road reserve.

No additional burials were found in the trench further east from Ferndale Drive (Figure 45 and Figure 46), but the remains of fire scoops, shell midden and hangi stones were exposed and recorded. These were sampled and the midden is described below. A dog mandible was found in one feature. In addition, a wooden fernroot pounder (patu aruhe) was found towards the eastern end of the trench (see Figure 3).

The trench excavations to the east of Ferndale Drive are described according to different "Areas", based on the house numbers relating to the landscaping modifications in the berm/road reserve in front of those houses (Figure 44).

A list of features found within each Area is provided in Table 1.

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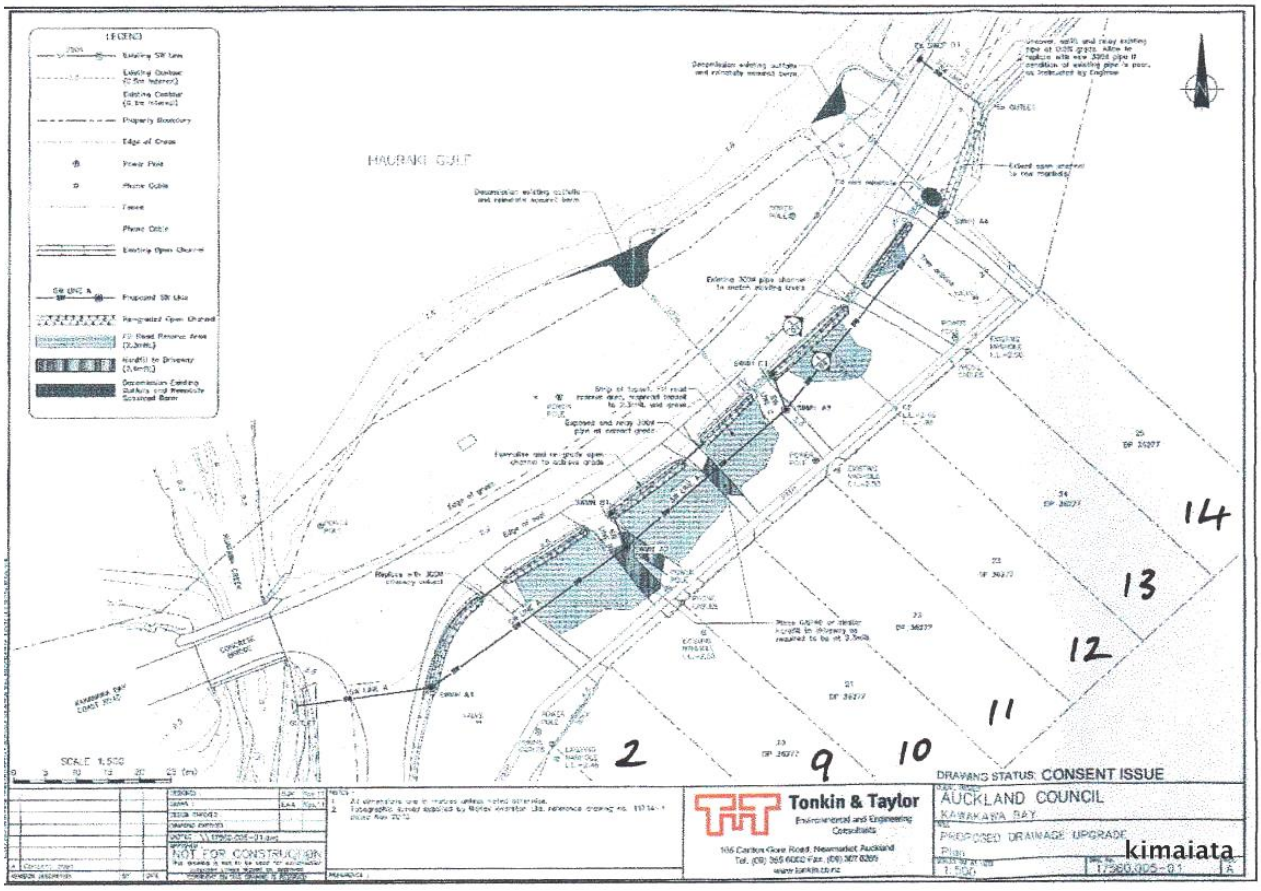

Figure 44. Drainage upgrade plan showing shaded areas (with house numbers added) along the road berm/reserve which were topsoil stripped prior to excavation of the stormwater trench (Tonkin & Taylor and Auckland Council). Areas referred to below relate to these house numbers

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Table 1. Areas 2 and 9-13 feature list

Area	Feature	Type	Size [mm]	Details	Image -Figure
2	8	Firescoop	1200 x 75 x 75	Hangistone, charcoal, crushed cockle	47, 48
	9	Firescoop	1000 x 50 x 50	Charcoal, some stone, crushed cockle	
	10	Firescoop	75 x 50 x 50	Charcoal, in baulk	
9	1	Firescoop	1200 x 1000 x 50	Trenched; contained charcoal stained sand and crushed cockle and canine mandible	50, 51, 53
	2	Firescoop	600 x 600 x 75	In baulk; contained charcoal stained sand and crushed cockle	51
	3	Firescoop	1200 x 1200 x 130	Trenched; contained charcoal stained sand and crushed cockle	51
	4	Firescoop	750 x 600 x 75	In baulk; contained charcoal stained sand and crushed cockle	51
	5	Shell scatter	1400 x 900	In baulk; not excavated; crushed cockle	50, 51
	6	Firescoop	1200 x 1000 x 300	In baulk; contained charcoal stained sand, crushed cockle, pipi and small broken hangistone	50, 51, 52,
	7	Firescoop	800 x 500	Not excavated; contained charcoal stained sand and crushed cockle	50, 51
10	1	Shell scatter	1500 x 1250	Shallow scatter of charcol stained sand	54
	2	Shell scatter	500 x 500	Shallow scatter of charcol stained sand	54
	3	Shell scatter	1250 x 500	Shallow scatter of charcol stained sand	54
	4	Shell scatter	500 x 500	Shallow scatter of charcol stained sand	54
	5	Firescoop scatter	4500 x 2000	Scatter of charcol stained sand, shell, and some hangistone	54
	6	Shell Deposit	700 x 700	Shallow scatter of charcol stained sand	54
	7	Shell Deposit	500 x 500	Shallow scatter of charcol stained sand	54
	8	Firescoop	1000 x 500 x 100	In baulk; contained charcoal stained sand, crushed cockle and hangistone	54, 56
	9	Cooking area	1200 x 100	In baulk; contained charcoal stained sand, crushed cockle, and hangistone	54, 55
11	1	Cooking area	11000 x 5500	Firescoops, hangistone, charcoal stained sand, variety of shell and fishbone	57, 58,59
	2	Firescoop	1000 x 1000	Shell and hangistone	57,58,59

Area	Feature	Type	Size [mm]	Details	Image -Figure
	3	Cooking area	600 x 250	Shell varieties & fishbone concentration	57,58,59
	4	Firescoop	1000 x 500	Trenched, Shell and hangistone	57,58,61
	5	Cooking area	1000 x 750	Shell deposit, charcoal stained sand	57,58
	6	Firescoop	750 x 750 x 150	Half sectioned, variety of shell and hangistone	57,58,60
	7	Shell deposit	500 x 500	In northern baulk, charcoal stained shell	57,58
12-13	2	Profile	3500	In northern baulk, crushed cockle	64,66(R)
	3	Narrow trench	1400 x 250 x 50	Cache of shell and some fractured stone	63,64
	4	Hangistones	1500 x 1500	Surface scatter of river stones	63,64,65(L)
	5	Profile	2750	In western baulk, variety of shells, hangistones, charcoal stained sand	63,64,66(L)
	6	Hangistones	1500 x 1500	Surface scatter of river stones	63,64,65(R)

Figure 45. View of pipe laydown along trench alignment

Continued on next page

Figure 46. Clearance of area for trench

AREA 2

Area 2

Area 2 consisted of the location along the trench alignment from the urupa and across the driveway to #2 Ferndale Drive (Figure 47). It was here that three fire scoops (Features 8, 9 and 10) including a cache of hangi stones were located (Figure 48), 250mm below the driveway surface. As well as the hangi stones, crushed and broken shellfish remains included cockle (*Austrovenus stutchburyi*), pipi (*Paphies australis*), rock oyster (*Saccostrea cuculata*), and mussel (*Perna canaliculus*). Following the topsoil strip and excavation of the trench, a profile section in the driveway was recorded (Figure 49).

Of interest was the 100mm thick charcoal-stained layer visible during the areal excavation which appeared to be a mixed cultural-tidal wash layer. No other pre-European or historic cultural indicators, such as bone, artefacts, ceramics, glass or metal were observed. There was no drainage upgrade required in the berm/roadside reserve for Area 2.

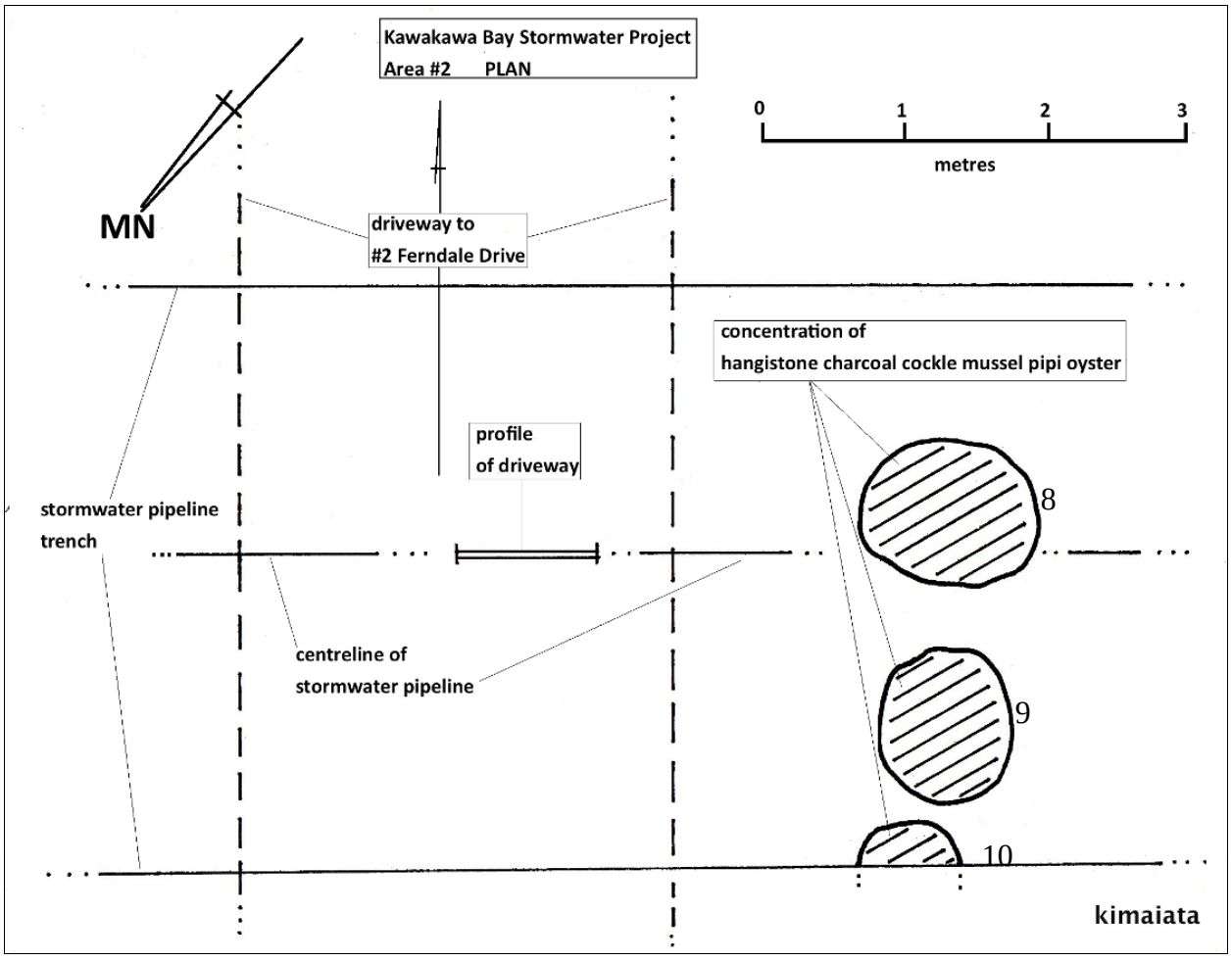

Figure 47. Area 2, Features 8-10 in trench excavation

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AREA 2, CONTINUED

Figure 48. View westward, across the two fire scoops (Features 8 and 9), and partial third one (Feature 10) in the baulk at right, and towards the trench shield and installed stormwater pipe

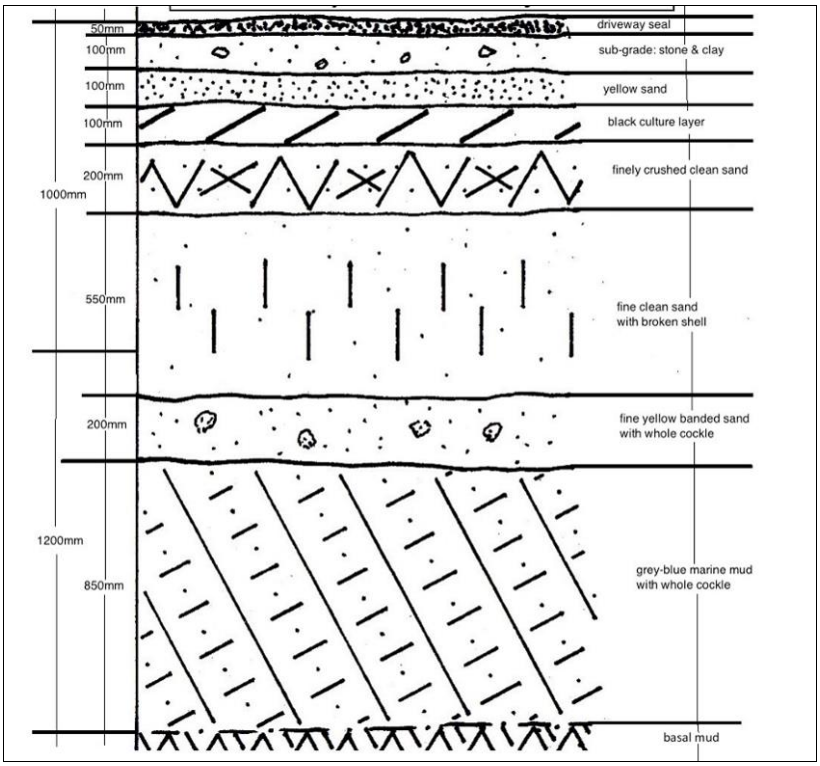

Figure 49. Profile section of stormwater trench across 2 Ferndale Drive access driveway

AREA 9

Area 9

Area 9 was approximately 140m^2 (14.5m x 9.6m) and contained remnants of fire scoops and scattered charcoal-stained sand (Figure 50–Figure 51). A large fire scoop (Feature 6) measuring 1200mm x 1000mm x 150mm was situated in the southern baulk was half-sectioned (Figure 50–Figure 52) and contained small broken hangi stones and mostly broken cockle (*Austrovenus stutchburyi*) and pipi (*Paphies australis*) shell in a charcoal-stained sandy matrix.

Two other fire scoops. Feature 1 and Feature 3, were trenched, but were shallow (10mm-20mm thick) and had no contents apart from a charcoal stained sandy matrix with some crushed cockle, and a canine mandible in Feature 1 (Figure 53). The western baulk Feature 5 showed the shallow spread of charcoal blackened sand, but no artefacts were observed.

The most significant feature in Area 9 was the fire scoop in the southern baulk (Feature 6). Several of the other fire scoops (Features 2, 4 and 7) showed that they were either temporary or casual locations for cooking as they were shallow, contained no cooking stones, and had no identifying characteristics. The one exception was the canine mandible recovered from the fire scoop to the north of that in the southern baulk (Figure 53).

A layer of mixed sand with charcoal and other material (referred to as the "cultural layer") covered many of the features here.

Figure 50. View southwards showing the sectioned fire scoop Feature 6 in the southern baulk; firescoop Feature 1 in the foreground containing the canine mandible; and charcoal-stained and Feature 5 scattered along the south-western baulk at right

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AREA 9, CONTINUED

Figure 51. Plan of Area 9 showing locations of Features 1-6 and profile of Feature 6 in the southern baulk

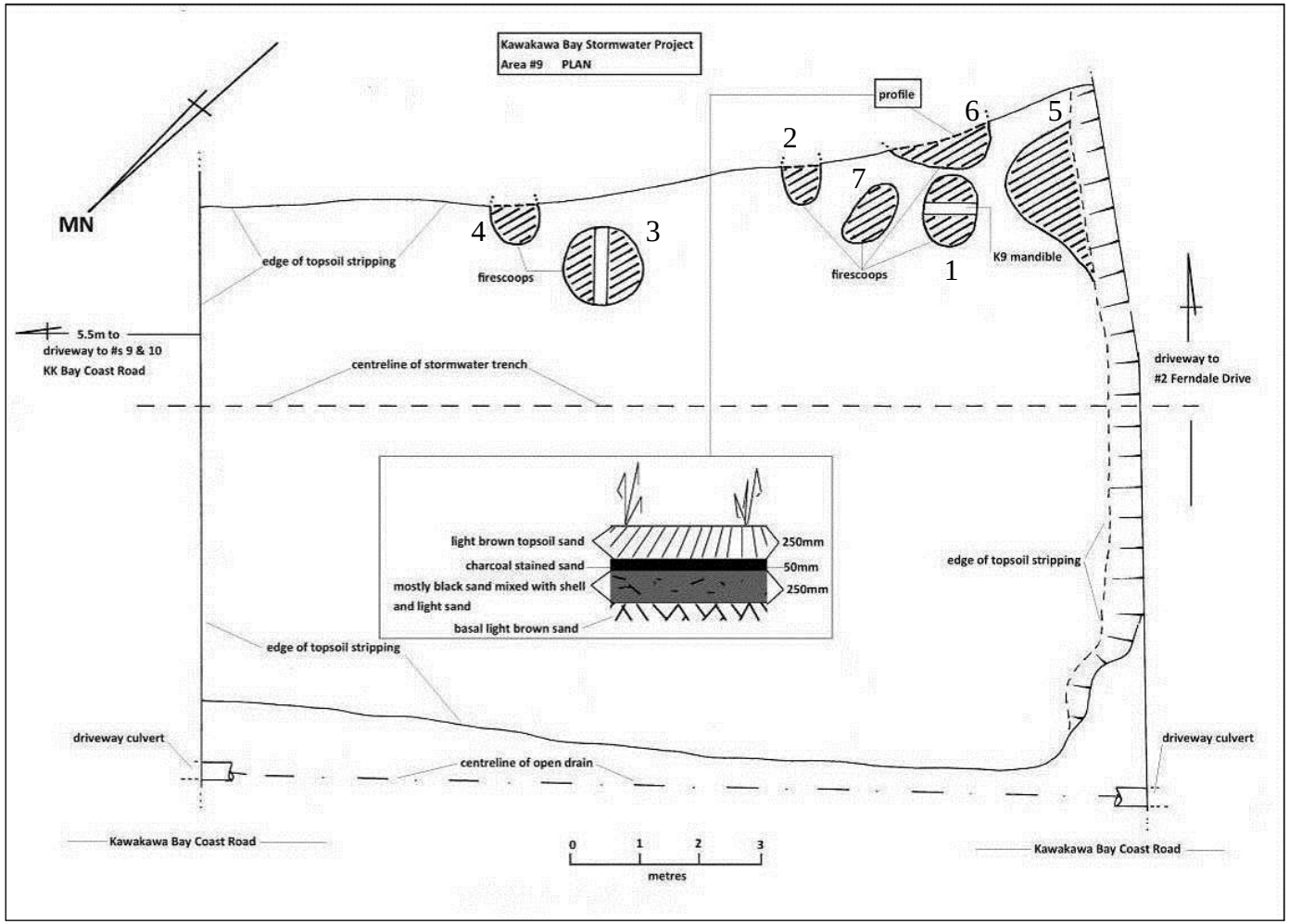

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Figure 52. Close up profile view of the fire scoop Feature 6 continuing into the southern baulk. A 50mm thick continuous band of blackened sand (the cultural layer) below light brown sand and above the charcoal rich stained fire scoop sand below. A small cache of hangi stones was located in the fire scoop's upper surface with broken cockle (*Austrovenus stutchburyi*) and some pipi (*Paphies australis*) shell

Figure 53. Canine mandible located in the fire scoop Feature 1

AREA 10

Area 10

Topsoil stripping in Area 10 uncovered an area of approximately 140m^2 (14m x 10m) with much of the exposed cooking areas lying along the southern baulk. There were concentrated areas of charcoal stained sand in both the southern corners with minor deposits along the western baulk (Figure 54 and Figure 55). Hangi stones were not as prevalent as in Area 9, although several were collected for analysis in the south-eastern and middle areas.

A cross-section profile cleaned down at the south-eastern corner baulk (Feature 9) showed that 150mm of thick clean light brown sand covered a 150mm thick charcoal-stained black sand layer which lay above the basal light brown sand (Figure 55). The main cooking area in this corner was approximately 1000mm x 1200mm with indications that it extended further into the baulk.

Cockle *(Austrovenus stutchburyi*) and pipi (*Paphies australis*) remains were burnt, broken, and crushed in the stained sand. Several hangi stones were collected from the central fire scoop Feature 8 which measured 1000mm x 500mm, and was 100mm thick/deep (Figure 56).

The western corner of this Area, Feature 5, consisted mostly of the persistent charcoal-stained black sand with scattered shell remains and an occasional hangi stone, suggesting that concentrated fire scoop cooking areas probably occurred further into the southern baulk. Features 1, 2, 3, 4, 6 and 7 were minor shallow scatters of charcoal stained sand along the western fringe without any other contents, such as hangi stones, charcoal, or other defining material (Figure 54).

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Figure 54. Plan of Area 10 showing the locations of Features 1-9

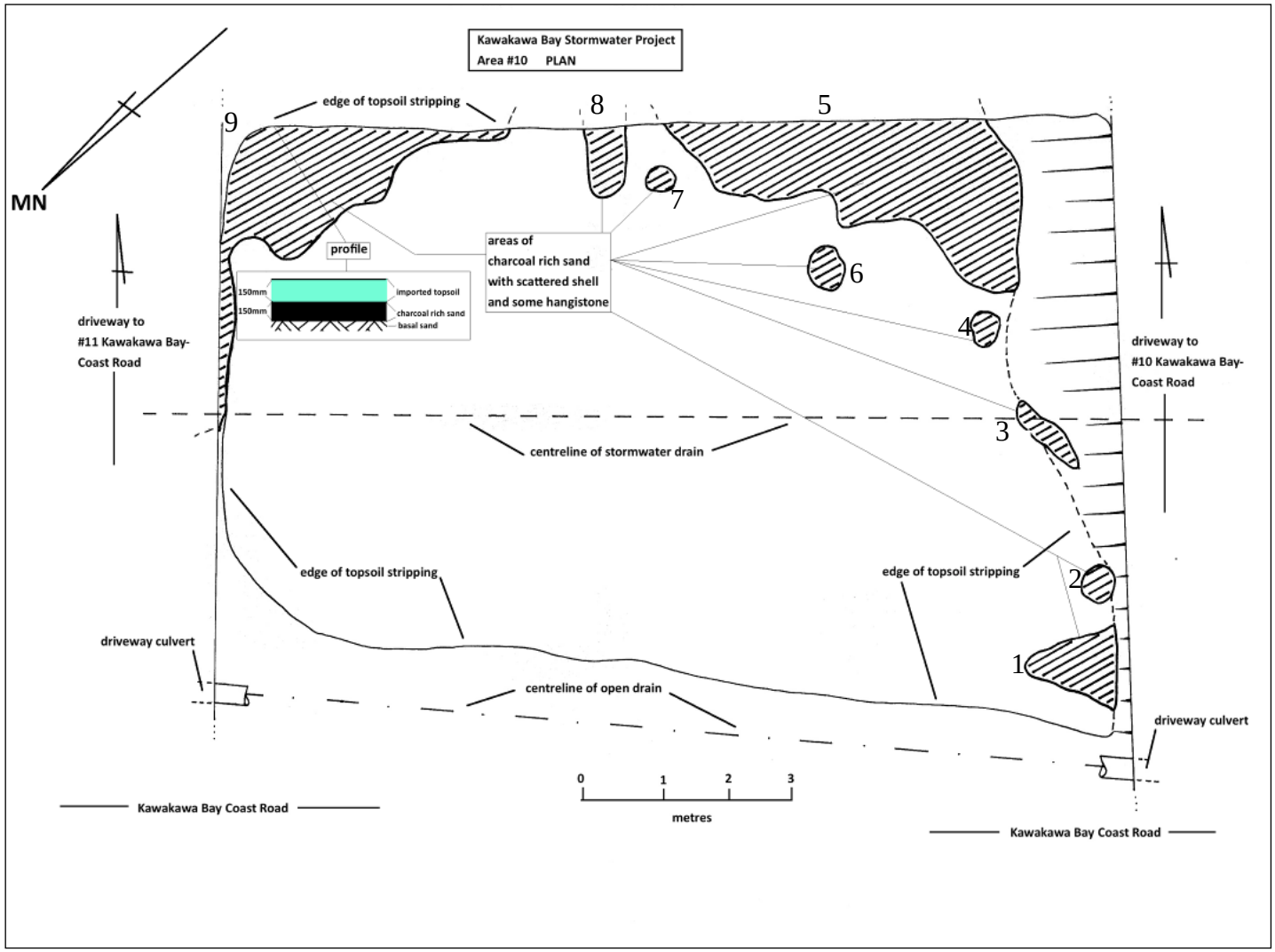

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Figure 55. Showing the several hangi stones and the black charcoal-stained sand layer below the light brown sand cover; the scatter from the fire scoop cooking area Feature 9 radiates outwards

Figure 56. Fire scoop Feature 8 containing several hangi stones and scattered shell through the charcoal-stained sand

AREA 11

Area 11

Area 11 was located between the driveways of 10 and 12 Kawakawa Bay Coast Road and covered a topsoil-stripped area of approximately 68m^2 (9m x 7.5m) (Figure 57 and Figure 58).

A significant cooking area, covering approximately 20m^2, Feature 1, had a concentration of hangi stones with a major scattering of charcoal-stained sand, Feature 1. In a close-by location, Feature 3 comprised a concentration of pipi (*Paphies australis*), cockle (*Austrovenus stutchburyi*), scallop (*Pecten novaezelandiae*) and fishbone (Figure 59). Much of the shell across Feature 1 was broken and crushed.

A cross-section profile of Feature 1 (Figure 57) showed that the fire scoop feature was mostly 100mm thick with an area in the middle up to 200mm thick, suggesting this was the principal cooking location. A concentration of hangi stones were piled to the side, as noted in Figure 59 and the cross section profile in Figure 57. A cross-section profile of the western baulk, in Figure 57, also noted the charcoal stained cultural layer was significant across project area.

Two other locations contained fire scoops: Feature 6, being 750mm in diameter, which was half-sectioned and up to 150mm thick at the middle (Figure 60); and Feature 4, which was within the main scatter of charcoal-stained sand and shell scatter. It was trenched and found to measure 600mm in diameter and was 100mm thick at the middle (Figure 61). The hangi stones from these features were examined and those showing evidence of secondary use as hammerstones were added to the hangi stone collection (see discussion below).

Some fragmentary human bone was identified in this area (see Hudson 2015) but was not in situ.

Two drainage field tiles immediately below the topsoil stripping were recovered from this Area when the stormwater trench was excavated later. The tiles were part of a drainage system across the berm/reserve in the trench line close to the driveway (Figure 62). Both tiles measured 600mm long x 240mm diameter: one was a NZ Brick Co tile which was salt glazed, and the other a Glenburn Fire tile which had a natural clay finish.

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AREA 11, CONTINUED

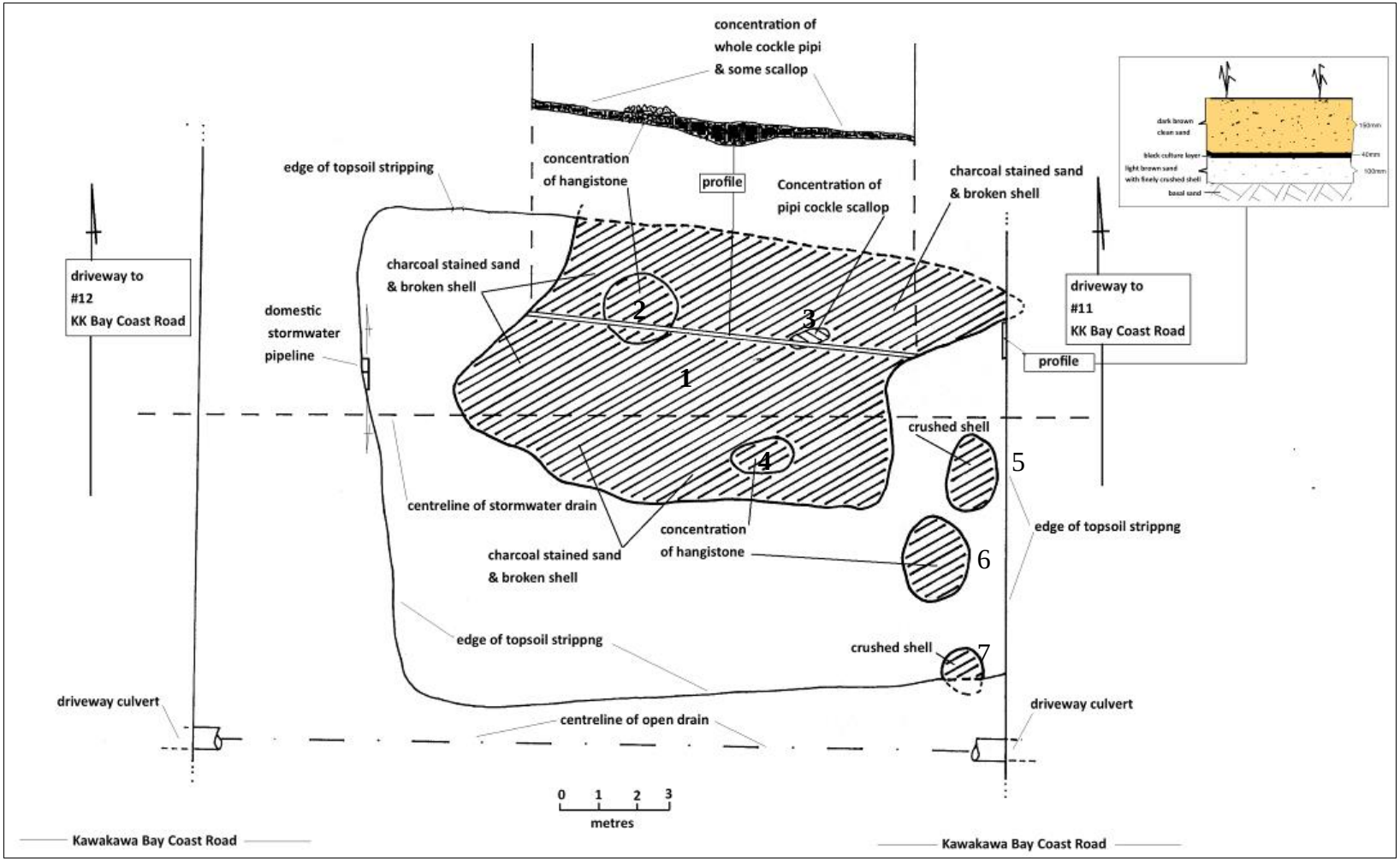

Figure 57. Plan view of Area 11 showing Features 1-7

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AREA 11, CONTINUED

Figure 58. Area 11 showing the extensive cooking area Feature 1 with separate fire scoops Feature 4 and Feature 6; the open stormwater drain prior to the drain reinstatement is to the front of the image

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Figure 59. Trench across the main cooking area Feature 1 and hangi stones from the side of the fire scoop Feature 2

Figure 60. Fire scoop Feature 6 full of hangi stones (L); and after being half-sectioned (R)

Figure 61. Sectioned fire scoop Feature 4 contained hangi stones in a charcoal-stained sand matrix

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Figure 62. Drainage field tiles: *N.Z. BRICK.C NEWLYNN* (L), and *GLENBURN FIRE* (R)

AREAS 12-13

Area 12-13

Within Area 12-13 about 11m x 8m was stripped (Figure 63–Figure 64). A minor change of plans required a realignment of the stormwater pipeline from the SWMH #3 (Stormwater Man Hole) from the middle of the driveway to #12 Kawakawa Bay Coast Road.

Much of the topsoil stripped area did not show any concentrated locations of hangi stone or charcoal stained sand with shell deposits, apart from a small cache of pipi (*Paphies australis*), cockle (*Austrovenus stutchburyi*), mussel (*Perna canaliculus*) and fractured stone in what appeared to be a narrow depression, Feature 3, with a depth of up to 50mm angling across the Area. Dual plastic stormwater drains crossed the berm/road reserve with one pipe each from the residential houses 12 and 13 (Figure 64).

Two areas of scattered river hangi stone – Feature 4 in the southeast, and Feature 6 in the north – were also noted (Figure 65), although there were no fire scoops or charcoal stained shell and sand associated with them.

Feature 5 was located in the western baulk and showed a 3m section of the charcoal stained layer with crushed shell, and above that was a layer of cockle (*Austrovenus stutchburyi*), pipi (*Paphies australis*), mussel (*Perna canaliculus*), and fractured stone (Figure 66). Feature 2 consisted of a charcoal stained topsoil over a crushed cockle layer in the northern baulk (Figure 66[R]). An examination of the spoil heap from this Area recovered tree fragments (Figure 67 [L]), as well as sheep bone (Figure 67 [R]).

Figure 63. View southwards across Areas 12-13 showing the plastic drainage pipes, and the two river hangistone scatters (arrowed)

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Figure 64. Plan view of Area 12-13 showing Features 2, 3, 4, 5 and 6, and baulk profiles

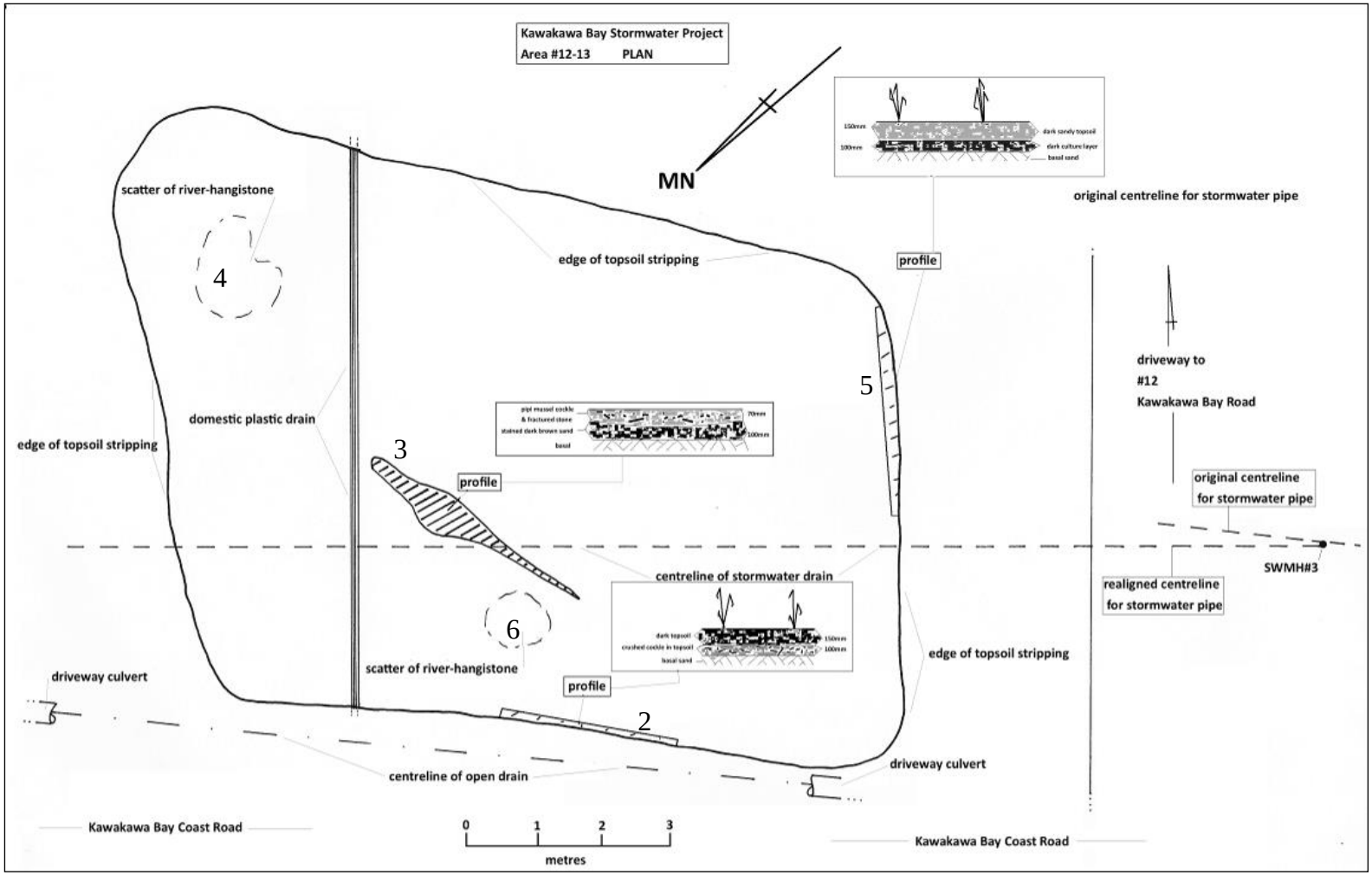

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Figure 65. Feature 4 south-eastern stone scatter (L); Feature 6 northern stone scatter below shell deposit (R)

Figure 66. Feature 5 in the western baulk (L); cockle deposit in the northern baulk (R)

Figure 67. Material recovered from topsoil including tree fragments (left) and animal bone (right)

AREA 14

Area 14

This area was affected principally through the excavation of the stormwater trenching. However, the southern baulk exposed a residential stormwater pipe entering the drainage line (Figure 68–Figure 69).

Two wooden artefacts, a patu aruhe (fernroot beater) and a possible wana (sharpened stake) were recovered in the layer below the topsoil immediately below the corner of the fence line (Figure 68). These were sent to the University of Auckland Conservation Laboratory and are described below.

Figure 68. View south-east showing the locations of SWMH #4 and the Area 14 residential stormwater pipe (location of wooden artefacts arrowed)

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Figure 69. View showing the installation of the stormwater pipe, which had been cut down onto basal yellow marine sand and through a mixed brown topsoil-sand, and fill above the pipe consisting of a mix of stone and sand

RAUTAWA STREAM

Rautawa Stream Banks

Subsequent to the work described above, the Rautawa Stream banks around the outlet and under the bridge were cleared to improve the flow (Figure 70). Works also included improved drainage around the outlet pipes (Figure 71 and Figure 72).

Earthworks were undertaken in the intertidal zone to clear the channel and it was during a close inspection of these works that Tony Beamish, kaitiaki for Ngai Tai, located one femur (upper leg bone) and a further fragment of possible arm bone.

Figure 70. Excavation in the Rautawa Stream bed and bridge buttresses

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RAUTAWA STREAM, CONTINUED

Figure 71. Scour apron installed below stormwater outfall in Rautawa Stream bed

Figure 72. View upstream of Rautawa Stream, stormwater outfall, and silt-sand bunding

Part 3: Analysis

MIDDEN ANALYSIS

Midden Analysis

Samples of midden material extracted from various locations were analysed for species identification and minimum numbers of individuals (MNI). All hinge portions and whole shells of bivalves, and identifiable portions and whole shells of univalves or gastropods were extracted and separated into species. MNI for bivalves was calculated by counting the number of whole shells and hinges present and dividing by two.

All bags were weighed, and the sample halved. One half was floated for charcoal, etc. then put through very fine sieve (1.4mm mesh). The charcoal, bone, tiny shells, etc. that floated were left to dry in trays. Charcoal, shells that were complete enough to be identified and bone were collected from the floated portion of the samples.

The second half of each soil sample was wet sieved in a larger meshed sieve (5.0 mm mesh). These were left to dry. Shells that were complete enough to be identified, bones and some charcoal were collected from the wet sieved portion of each soil sample. Tuangi cockles were collected from each soil sample for C14 dating. However, only samples 2, 4, and 5 had at least 30g, the amount required for C14 dating of cockle. The results are shown in Table 2.

One obsidian flake was also recovered (Figure 73), which appeared dark grey but was not specifically sourced.

An adze fragment (Figure 74) was recovered from topsoil stripping ("general topsoil recovery". The adze fragment was partly ground and of grey stone (basalt).

Dozens of hangi stones were also recovered, some from during the topsoil stripping, some from in situ fire scoops.

A piece of worked mammal bone was recovered from Area 11 on the surface of a midden/firescoop (Figure 75).

Hangi Stones

Hangi stones were closely examined with several noted as being multifunctional, having previously been used as hammerstones. These were added to a collection of hammerstones from the stormwater project area, which were photographed before being reburied (see below). They appeared to be river cobbles.

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Table 2. Midden samples (highlighted samples suitable for dating)

Sample	Location	Date	Weight (g)	FCR presence in sieve (%)	Shells present in sieve	Other fauna
1	Area 11, Feature 3	29.4.14	3178	50-75	3 tuangi cockle (*Austrovenus stutchburyi*); 1 tuatua (*Paphies subtriangulata*); 2 pipi (*Paphies australis*); 1 hornshell (*Zeacumantus lutulentus*); 1 purple-mouthed whelk (Cominella glandiformis)	n/a
2	Area 11,Feature 6	29.4.14	3130	1-25	1 large dog cockle (*Tucetona laticostata*); 10 tuangi cockle; 1 purple-mouthed whelk; 1 mudflat topshell (*Diloma subrostrata*)	small amount unidentified fishbone
3	Area 9, Feature 1	22.4.14	9139	1-25	7 tuangi cockle; 1 oyster (*Saccostra cucullata*); 5 hornshell; 1 mudflat topshell; 3 purple-mouthed whelks	large amount fishbone, mostly unidentified, but includes large vertebrae; dog incisor
4	Area 11, Feature 1	29.4.14	3549	1-25	37 tuangi cockle; 5 pipi; 3 oyster; 2 mudflat topshell; 1 tuatua	large amount of fishbone
5	Area 10, Feature 9	29.4.14	3278	0	11 tuangi cockle; 3 pipi; 1 turret (*Maoricolpus roseus*); 1 purple-mouthed whelk; 1 hornshell; 1 cat's eye (*Turbo smaragdus*)	small amount of fishbone
6	Area 10, Feature 8	24.4.14	3624	1-25	1 pipi; 1 hornshell; 1 turret; 1 oyster; 1 mudflat topshell	n/a
7	Area 10, Feature 9	24.4.14	3747	1-25	6 tuangi cockle; 2 pipi; 2 hornshell; 1 purple-mouthed whelk; 1 mudflat topshell	n/a
8	Area 9, Feature 1. Same as Sample #3	22.4.14	10753	1-25	17 tuangi cockle; 4 oyster; 4 mudflat topshell; 4 turret; 4 hornshell; 3 pipi; 1 purple-mouthed whelk	small amount of fishbone, including snapper (?) mandible and large vertebrae

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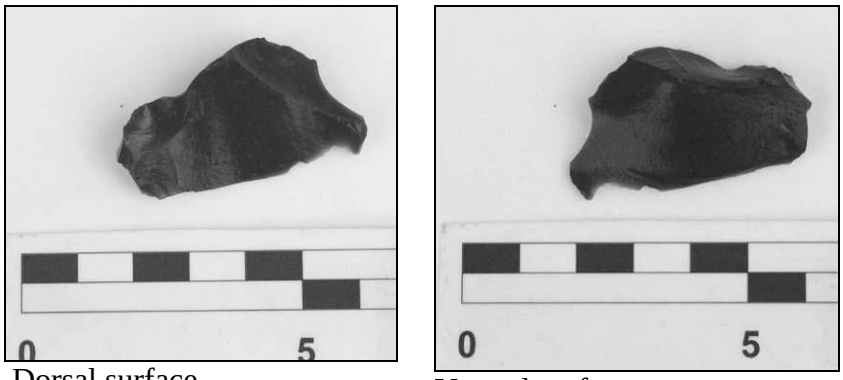

Dorsal surface Ventral surface

Figure 73. Obsidian flake from midden

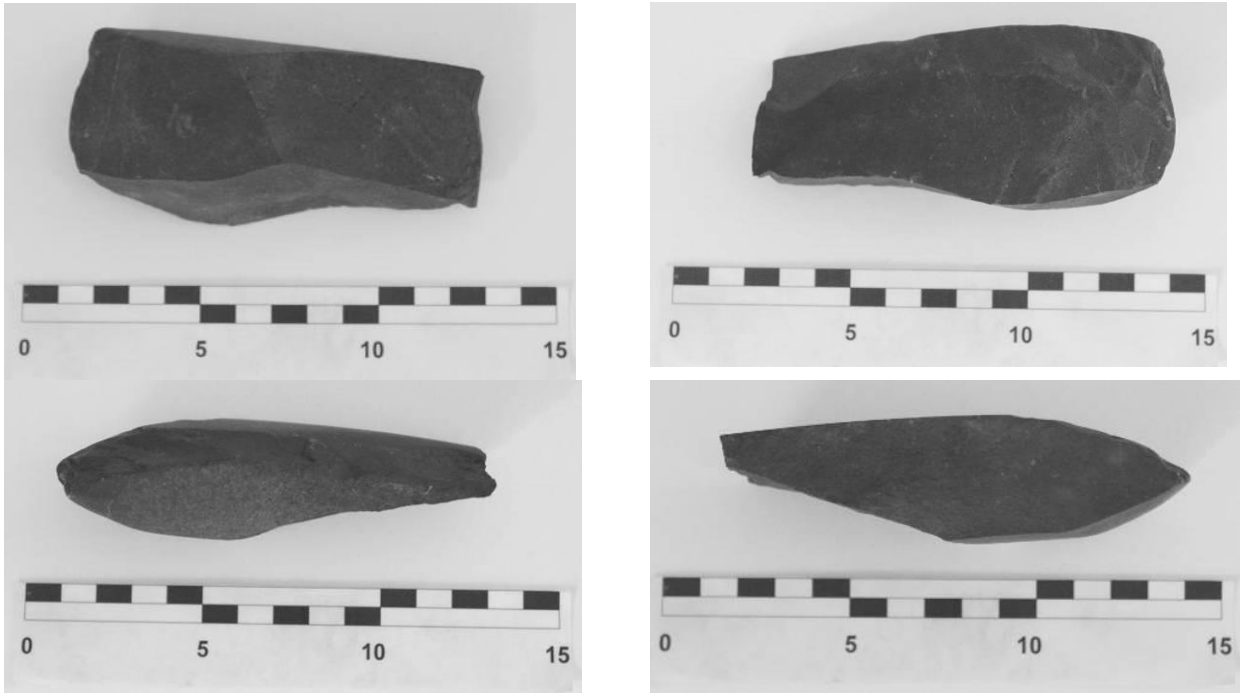

Figure 74. Adze fragment from topsoil stripping

Figure 75. Mammal bone showing signs of working from Area 11

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Figure 76. Hammerstones from excavations

CHARCOAL

Samples

Nine charcoal samples were submitted to Dr Rod Wallace of the University of Auckland (see Appendix 3). The results of the charcoal identification are summarised in Table 3. They indicate that the charcoal originated from regenerating secondary woody vegetation including bracken and small shrubs but dominated by manuka and kanuka accompanied by a few larger broadleaf tree species. There were no conifers present.

Table 3. Summary charcoal specifies identifications from excavated features

Species	Plant Type	# Pieces	%
Fernroot	Fern	3	3%
Tutu	Small shrubs	1	25.5%
Hebe		2	
Fivefinger		7	
Pittosporum		3	
Akeake		12	
Mapou	Larger shrubs/ small trees	7	53%
Mahoe		9	
Manuka		26	
Kanuka		10	
Kohekohe	Broadleaf trees	4	18%
Tarairi/Mangaeo		5	
Pohutukawa		4	
Puriri		5	

WOODEN ARTEFACTS

Fern Root Beater

The fern root beater (Figure 77) is made from mapou (*Myrsine australis*) and has a classic head shape and handle (see Table 4 for measurements). The wood was identified by Rod Wallace (courtesy Dilys Johns, pers. comm. 2015).

Two other patu aruhe were recovered in the nearby swamp during the Watercare Wastewater project (Harlow et al. 2012:109ff); these were similar in shape and also made from mapou. Another possible example recovered there was made from kanuka, also a hard wood suitable for the function of pounding fern root.

Fern root was first dried, soaked in water when needed and then roasted on coals before being pounded to separate the tough outer covering and coarse fibres from the starchy edible component (Furey 1996:164; Irwin 2004:96). The pounders have also been recorded as being used for beating flax (for processing the fibres) and pounding hinau bark to extract dye (Harlow et al. 2012: 148-149).

Table 4. Dimensions for patu aruhe

Patu aruhe	Dimension
Length	385mm
Width	77mm @ head; 23mm @ handle grip; 39mm @ handle knob
Thickness	69mm @ head; 23mm @ handle grip; 39mm @ handle knob

Sharpened Stake

This partly shaped wana or wooden stake was made from manuka (*Leptospermum scoparium*). Such stakes are relatively ubiquitous and could have been used for a number of purposes. The dimensions are shown in Table 5 and the stake in Figure 78.

Table 5. Dimensions for sharpened stake

Wana	Dimension
Length	510mm
Width	25mm
Thickness	25mm

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Figure 77. Fern root beater (courtesy Dilys Johns, University of Auckland)

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WOODEN ARTEFACTS, CONTINUED

Figure 78. Wooden stake (courtesy Dilys Johns, University of Auckland)

RADIOCARBON DATES

Radiocarbon Dates

Four radiocarbon dates from features in the excavated areas were obtained (see Appendix 2). Two main features – SS2 in Area 11 (fire scoop Feature 6) and SS5 in Area 10 (Feature 9) – provided dates, with a charcoal and a shell date for each feature. The SS2 pair provided good correlation and suggested an 18th century occupation for the site, while a less reliable pair from SS5 gave also suggested a 18th or 19th century date for the charcoal but an anomalously early date for the shell sample (over 2000 years old, see Appendix 2). This demonstrates the problem with dating shell from an area subject to significant tidal and storm surges.

Overall, the dates do suggest that the Taupo Village identified in the 1850s on plans had been occupied from around the mid-18th century. This fits with the oral histories associated with the area.

The radiocarbon dates were compared with other dates from nearby archaeological sites (Figure 80, Figure 81). Two dates from S11/1066 at Turei Hill, at the western end of the Bay, reported by Plowman (2010b) provided a date range between the mid-17th and early 19th century for the settlement activities identified there. The results from S11/1076 (to the south – see Figure 81) appears to be indicative of occupation earlier than that recorded by Plowman at S11/1066, while S11/1074 was probably contemporary. The dates are also consistent with the dates reported in Harlow et al. (2012), although an earlier 17th century inland date was also identified.

A date obtained some time ago from Pawhetau Pa, S11/75, is reported in the NZ radiocarbon database. It comes from a human burial on the seaward terraces (NZ3661) with an uncalibrated age of 318 ± 85 BP. However there is large uncertainty with this date due to problems in dating human bone which may have significant marine diet components. This makes the date unreliable and of little use – at best, it might be argued to fall sometime post-1500 AD.

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RADIOCARBON DATES, CONTINUED

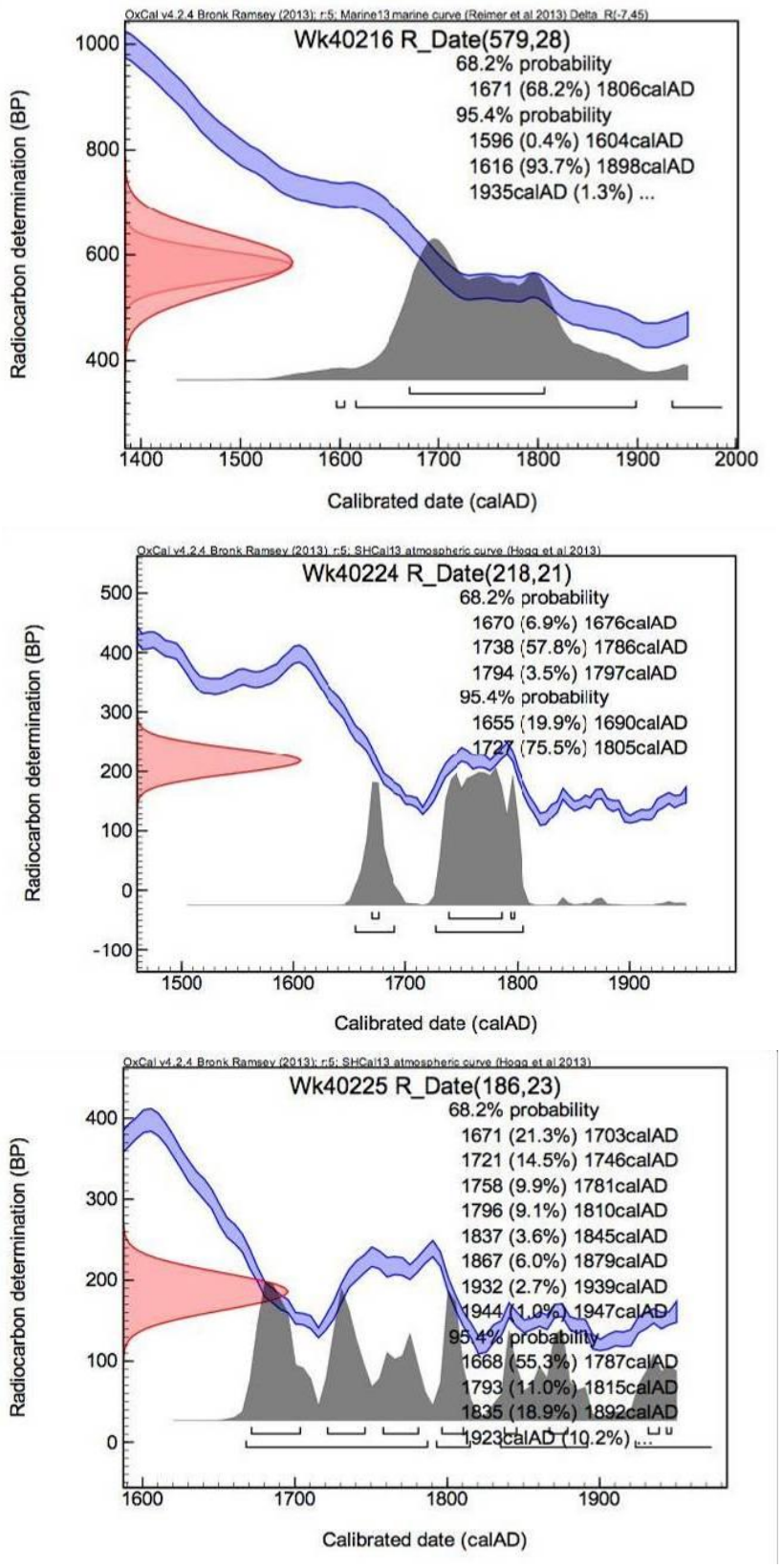

Figure 79. Radiocarbon dates from features

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RADIOCARBON DATES, CONTINUED

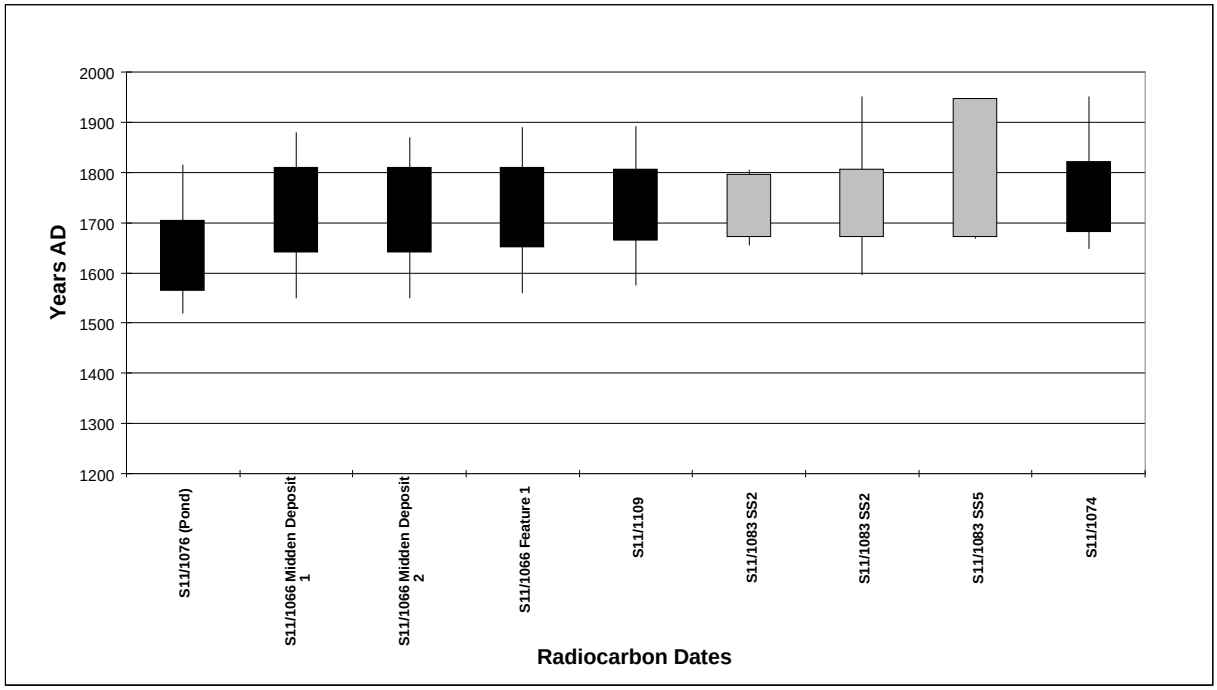

Figure 80. Radiocarbon dates from the Kawakawa Bay area (current project dates in grey)

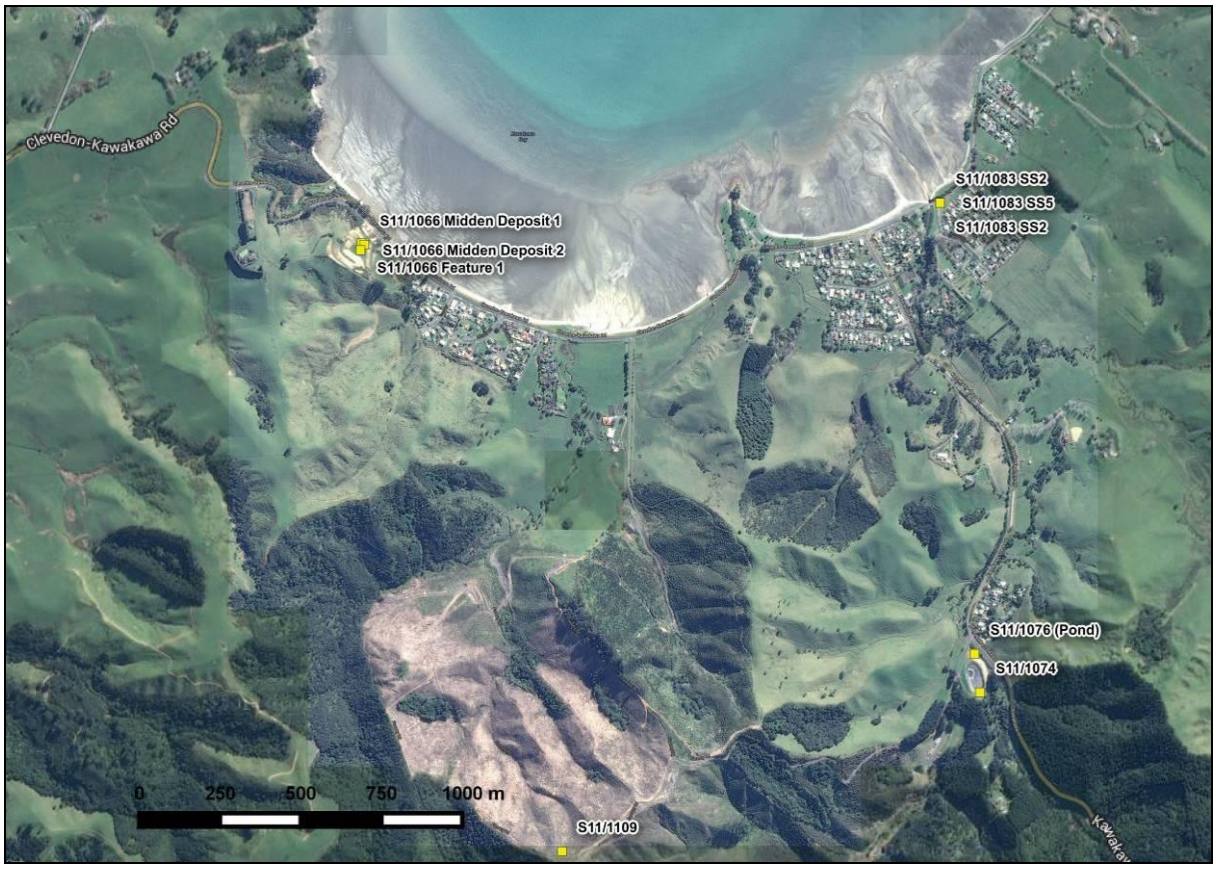

Figure 81. Location of radiocarbon dates from Kawakawa Bay

Part 4: Koiwi

SUMMARY DESCRIPTION OF KOIWI

Beatrice Hudson, ArchOS Archaeology

Introduction

Hudson (2015) provides a detailed analysis of the koiwi tangata found in Kawakawa Bay, and the results are summarised here. Figure 82 shows the location of the burials and their distribution. Hudson was assisted by Carly Mailhot as part of the excavation team. Brendan Kneebone and Freya Elmer from the University of Auckland volunteered their time.

Work Undertaken

The osteological work that has been undertaken included compiling an inventory of all the remains in each burial and gathering data to allow comment, where possible, on the following for each person:

- Age
- Sex
- Ancestry (broadly Polynesian, European or any other category)
- Height
- Did they show signs of any disease or injury?
- Does their skeleton tell us about any activities they performed?
- What was their diet like?
- Is it possible to comment on how they died?
- How were they buried?

Recording was undertaken according to recognised osteological standards. The recording for this project represents a basic level of in-field recording and is by no means exhaustive. All recording was based on examination with the naked eye only, and was carried out in the portable site office on location at Kawakawa Bay.

Support was given by representatives of Ngati Paoa and Ngai Tai ki Tamaki to take one of the bones and a group of artefacts to be radiographed.

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SUMMARY DESCRIPTION OF KOIWI, CONTINUED

Number of Individuals

Table 6 provides a summary of each burial and the individuals it contained. Nine burials were discovered and excavated in total, though three of these contained several individuals, which has brought the number of people represented by all the koiwi from the nine burials to 31.

Some of the individuals that contributed to this count were represented by only a small number of duplicated elements among the co-mingled remains in Burials 2, 7 and 8.

In Burial 2 for example, while there were limb bones for 5 adults, the number of right innominate segments show that at least one bone of a sixth adult was present. Also in Burial 2, a third baby was represented by two additional partial infant femur shaft segments, although there was nothing else of this infant present.

In this way, a small amount of bone can represent an additional person and increase the number of individuals.

Table 6. Summary of burials

Burial #	Age	Sex	No. of individuals
1	Older adult	Male	1
2	(multiple)	(multiple)	12
3	Older adult	Female	1
4	Young adult	Male	1
5	Child	Unknown	1
6	Mid-adult	Male	1
7	(multiple)	(multiple)	6
8	(multiple)	(multiple)	7
9	Mid-adult	Male	1
Total			**31**

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SUMMARY DESCRIPTION OF KOIWI, CONTINUED

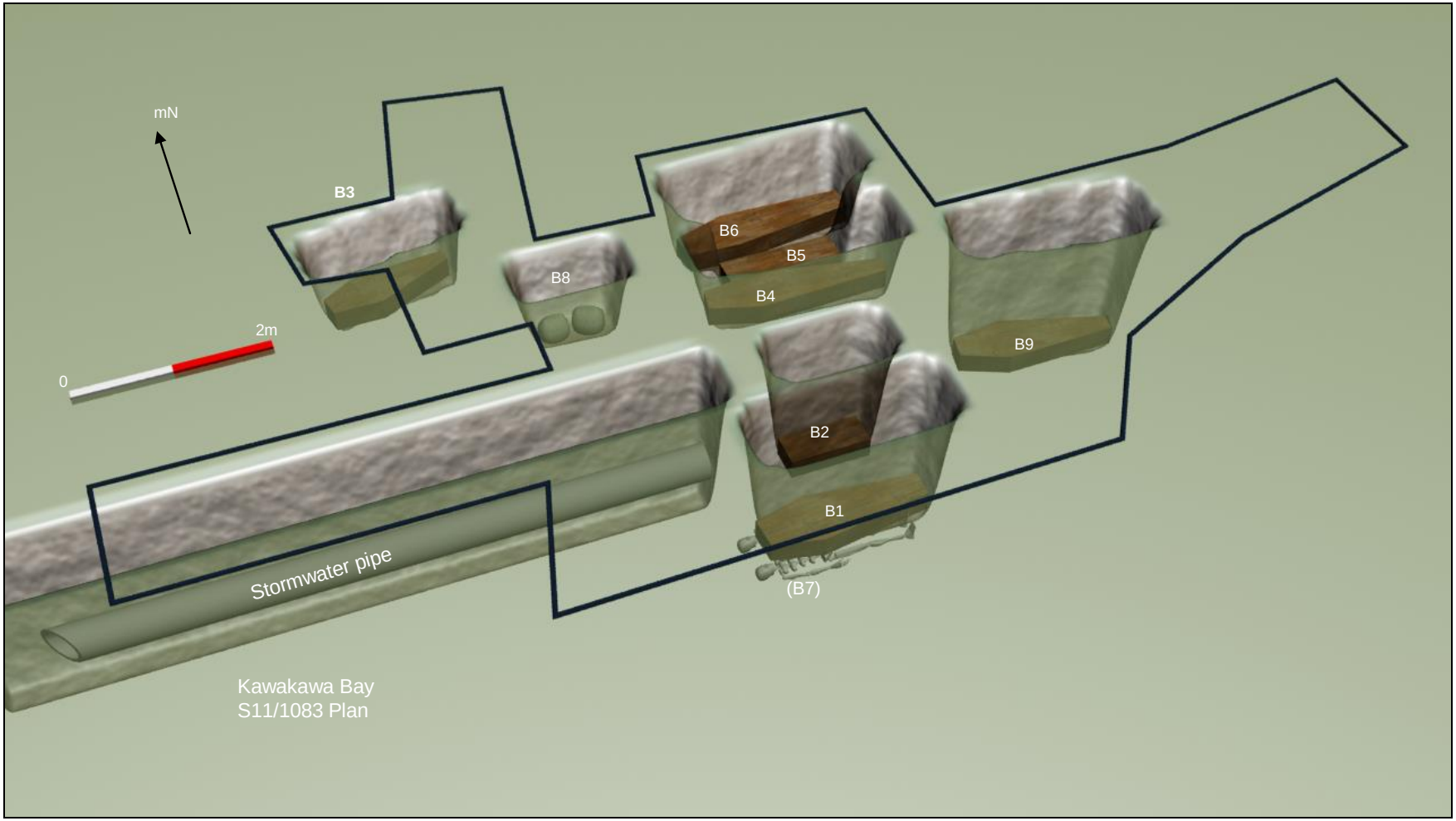

Figure 82. Distribution of coffins and burials

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Age Distribution

Figure 83 shows the distribution across age categories by sex. All ages and both sexes were represented in this small cemetery group. There were more males than females, with one female in each adult age group. The number of people who died as older adults and young adults was the same. The distribution of the age groups follows an expected pattern of high infant mortality with a smaller proportion of people making it to older adulthood.

Demography of a skeletal sample can help to illustrate the society in which the people lived and died. If there are a disproportionate number of individuals of one age or sex group for example, it can indicate that activity at the site was related to a division of labour (e.g. seasonal or site specific activity, warfare), or that burial practice required the differential location of the sexes. Neither of these was the case here, and this group is likely to represent an ordinary settlement inhabited by all ages and both sexes, at which males and females, adults and children could receive the same burial treatment.

The sub-adults (infants, children and adolescents) make up 52% (16/31) of the group, indicating high youth mortality. Littleton notes that high rates of infant mortality of around 30-40% of all deaths were recorded among Maori populations during the period 1840-1901 (Pool 1991 cited in Littleton 2000).

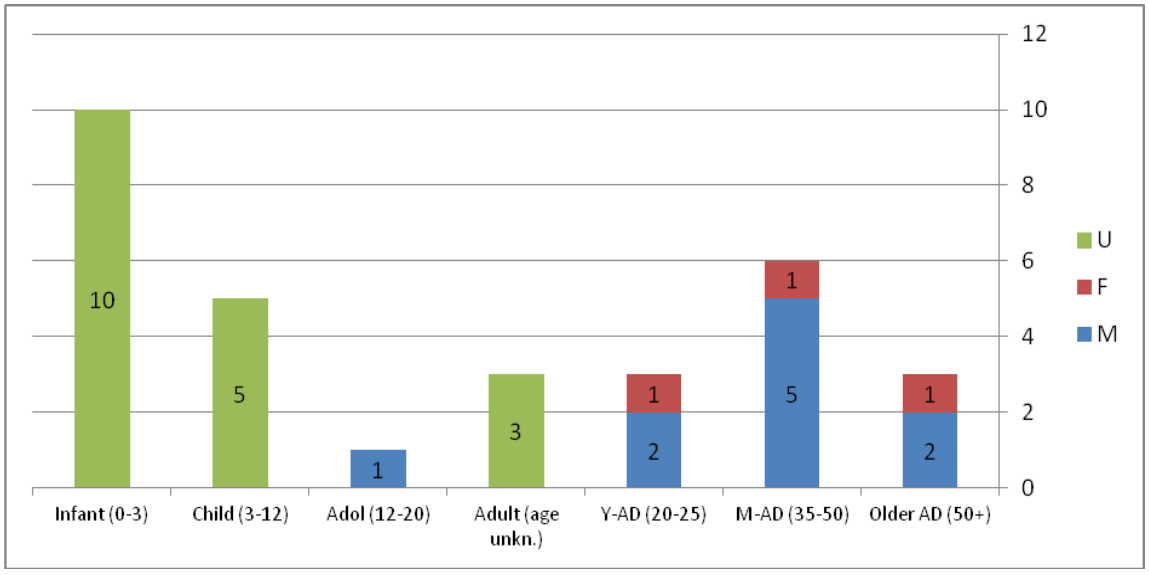

Figure 83. Distribution of age groups among the Kawakawa Bay koiwi

Age brackets are in years and Y-axis shows numbers of individuals. M = male; F = female; U = sex unknown

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Ancestry

The adults among the group generally showed many skeletal characteristics that are common among those of Polynesian ancestry.[5] The shapes of the crania and femora, in most cases, conformed with the suite of Polynesian features outlined by Houghton (1980) and summarised by Littleton (2005). Most humeri showed marked development of the deltoid tuberosity, indicating upper body robusticity, and all but one adult (B4) had squatting facets of the tibiae, which develop as a result of habitual squatting.

One of the best known Polynesian skeletal traits is the rocker jaw. It is not exclusive to Polynesians, but is particularly common among them, leading Houghton (1980: 43) to consider it "probably the most distinctive Polynesian feature of all." Though there were few very pronounced expressions of this feature ("true" rocker jaws), most adults had the curved inferior border of the mandible and high submental arch of the typical Polynesian jaw.

Exceptions to typical Polynesian characteristics were noted in Burials 4 and 7*c*. Burial 4 had a relatively gracile cranium, a sharp nasal sill and a very squared palette with crowding of the teeth and a non-rocker jaw. He had relatively straight long bones and no tibial squatting facets. He did have several other skeletal features to suggest Polynesian ancestry, however, and was, on balance, estimated to be Maori, though he may have had some mixed ancestry. Burial 7*c* was a very gracile woman who was distinguished among the comingled remains of Burial 7. Her bones were so small, gracile and straight that it was questioned as to whether she may have been European. On closer inspection the bones and skull of this individual did have a number of Polynesian traits, albeit only expressed very mildly.

In sum, these skeletons display traits that indicate they were Maori, as expected. They represent a settlement that was likely to have been predominantly Maori, though perhaps with some people of mixed ancestry.

Stature

The height estimates of each of those adults for whom a complete long bone of the lower limb could be measured are given below on Figure 84. This shows that three of the adults in Burial 7, both male and female, were particularly tall. Also shown on the graph are the head-to-heel measurements that were taken while the skeleton lay in the ground (for the complete, articulated burials). Most head-to-heel measurements support the stature estimates given by the regression equations, with the exception of Burial 9, whose in-ground measurement was about 9cm shorter than the calculated height. This man may have had long leg-to-back-length ratio or a high femur-to-tibia ratio, skewing the estimate to indicate someone taller than he in fact was.

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[5] Many of these features are not well developed until adulthood, so no attempt was made to estimate ancestry in the children.

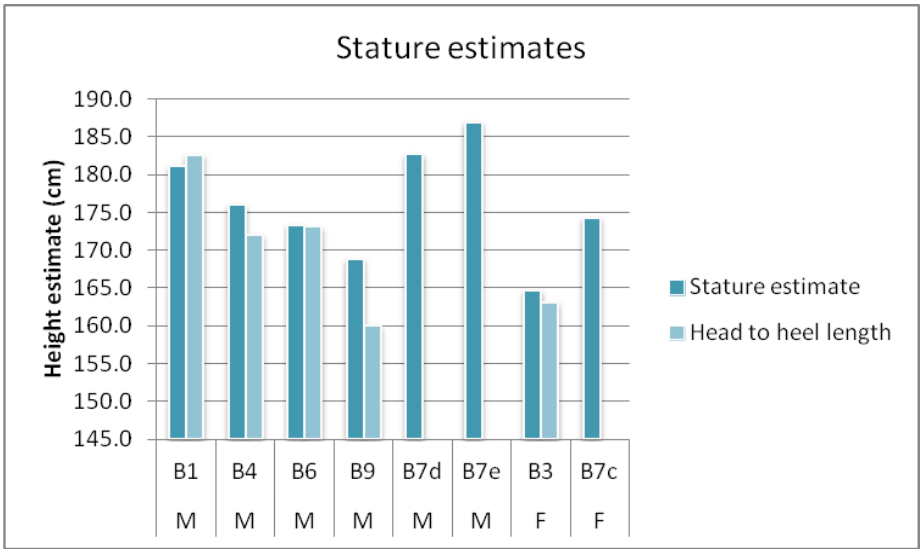

Figure 84. Stature estimates as calculated by regression equations from the length compared to the head-to-heel measurements taken in situ (where applicable). M = male; F = female.

Stature Comparison

Figure 85 shows the average male and female heights for this Kawakawa Bay group compared to a nationwide pre-contact average (Houghton 1996: Table 2.5, 44) and averages from the pre-contact NRD site (Hudson and Campbell 2011). Kawakawa Bay averages are notably taller for both sexes.[6] This indicates an increase in stature in the 19th century, perhaps indicating an increase in nutrition for at least some Maori populations compared to pre-contact times, though this would need more robust study to be conclusive.

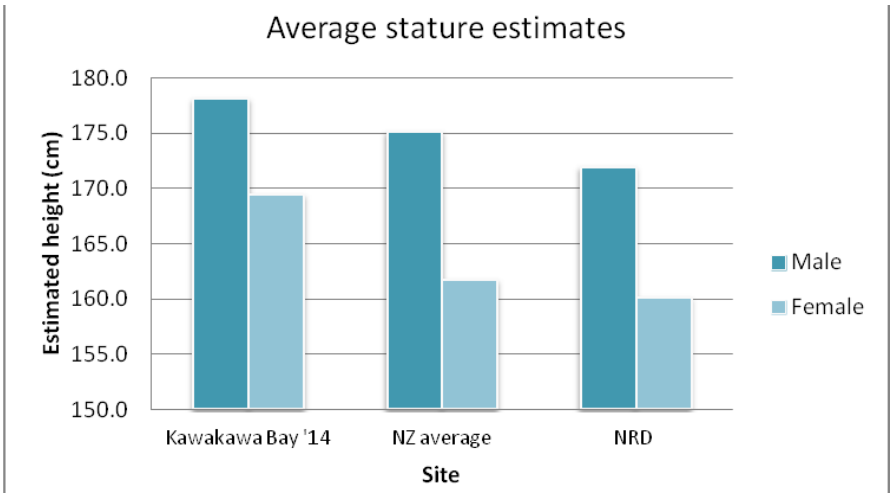

Figure 85. Average stature estimates from Kawakawa Bay compared to averages from two pre-contact groups of koiwi

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[6] Although note that if the individuals from Burial 7 are removed, the averages are much more similar to both pre-contact averages.

SUMMARY DESCRIPTION OF KOIWI, CONTINUED

Burial Position and Orientation

All those buried in coffins were laid on their backs with hands by their sides and oriented with the heads to a westerly direction. There were subtle differences in orientation which may be incidental or could suggest a temporal difference. Burial 3 and Burial 6 were oriented with heads to the south-west, while Burials 2, 8 and 5 were slightly west-south-west.

Burials discovered farther east in Kawakawa Bay were also oriented east-west and mostly laid on their backs with heads to the west or southwest, though one man in the group discovered at S11/1082 lay with the head to the east. This man was also laid face-down however, and thus seems to be an inversion of normal practice (Littleton et al. 2010; Littleton et al. 2006; summarised in Harlow et al. 2012).

Dentition, Diet and Smoking

The koiwi had very little tooth wear and generally minor dental disease. Overall, their teeth were in good health. Only three people had one or more teeth with severe wear. Burial 6 had particularly heavily worn first molars and was the only person at the site who had the so-called "fern root plane" wear that is very common among pre-contact Maori. The people with heavier tooth wear may have had a more traditional diet for part of their lives.

The general low level of tooth wear is a stark contrast to most pre-contact Maori koiwi. Among pre-contact Maori there was typically extremely heavy dental wear, which led to infection and tooth loss, a pattern of dental disease that has been described as occurring with "monotonous regularity" in the late prehistoric period and which has been attributed to a very harsh gritty diet that included, among other elements, the very fibrous fern root (Houghton 1980: 122, 1996: 232). Heavy tooth wear typically led to abscesses around the roots of the teeth, which would often cause infection to spread into the sinuses. Only Burial 6 had a visible abscess and most people in this group appear to have been spared the infections that their ancestors so frequently suffered.

The lack of dental wear and abscessing had been exchanged for an increase in other dental disease, though with milder effects. At least seven people had multiple cavities in their teeth. In many cases these were in the surface of the root, rather than the crown and this suggests recession of the gums due to destruction of the tissues around the teeth and resultant exposure of the root surfaces. It also demonstrates a less abrasive diet that included more sugar or sticky carbohydrate than the traditional diet. One child (B8 East *a*) had particularly large cavities in their deciduous teeth, which may have related to the illness evident in the rest of their skeleton.

Continued on next page

Dentition, *continued*

Periodontitis was also seen in some individuals (Burials 1 and 9 and two mandibles from Burial 2) for whom the destruction of the tissues around the tooth sockets was causing the teeth to loosen and be at risk of premature loss. Calculus (tartar, mineralised plaque) was present on the teeth and root surfaces of 10 individuals, though generally in mild deposits.

Two people's teeth held a record of illness suffered during infancy, when the teeth were forming. Linear grooves (linear enamel hypoplasia) had developed in the enamel as a result of growth disruption in Burial 4, who died as a young man, and Burial 8 West *a*, who died at the age of about 4-5 years. Both people suffered stress, likely from illness or injury, during their infancy that was sufficiently severe to temporarily halt their growth. Both survived that particular episode and one lived only a couple more years while the other grew to adulthood.

Curved notches in the canines and incisors or premolars are evidence that smoking tobacco pipes was popular. All adults for whom the anterior dentition was present had the curved notches that result from habitually clasping a curved object such as a pipe stem between the teeth. Many had multiple notches where they had held the pipe in several different positions over time. Both men and women smoked the pipes and the clear notches already worn in the teeth of the young Burial 4 suggest that he probably started smoking in his adolescence.

Overall, the dentition at Kawakawa Bay indicates a very different diet from that of pre-contact Maori. The influence of European diet and food processing was evident as the diet was no longer highly abrasive, but was soft and likely to have had a sticky carbohydrate component that left people susceptible to tooth decay instead of tooth wear. This was probably due to greater reliance on wheat flour, and possibly also potato, and the introduction of sugar. People were suffering from inflammation of the tissues around the teeth and many had build-ups of calculus (tartar) which may be due to a combination of the lack of abrasiveness and poor dental hygiene practices. On the whole, however, their dental health was good and they were spared a lot of the suffering of dental abscessing that their ancestors so often endured.

Pathology

Although they were spared from dental infection, several people did suffer chronic infection or disease elsewhere in their bodies. There were also two examples of injury to the skeleton and, though the adults were relatively free of joint disease, three people did suffer severe arthritis.

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Osteoarthritis and Joint Degeneration

Joint degeneration in the neck affected several adults at Kawakawa Bay and this was the most common place for joint degeneration among the group. Burials 1, 3, 6 and one of the adults in Burial 2 showed marked degeneration of the neck vertebrae and Burial 9 also had some mild degenerative changes beginning at one point in the middle of the neck. Degeneration in the cervical and upper thoracic vertebrae has been related to heavy upper-body use, particularly among pre-contact Maori (Houghton 1996: 226). These people at Kawakawa Bay showed greater strain on the neck than on the lower, more weight-bearing spine, which points to vigorous upper body use rather than solely heavy load-bearing.

One of the adults in Burial 2 had spondylolysis in the lower spine, a condition that indicates repetitive strain on the lumbar spine, probably combined with some genetic predisposition to the condition.

One of the adults in Burial 2 had severe osteoarthritis in non-spinal joints. Osteoarthritis had polished bones smooth in both the left and right feet and the left wrist. This person evidently placed a lot of mechanical strain on the feet and had a very dexterous thumb.[7]

Injuries

Evidence of injury was seen in one woman and a child. Burial 3, an old woman, had a badly distorted elbow that appears to have been due to a fracture. The elbow was misshapen but had healed without severe ongoing complications. At the base of the humerus, it is an unusual location for a break, particularly one that did not affect the ulna, and it is not clear how such an injury could have happened. The woman also had what may have been a compression fracture to the spine, though poor preservation of the bone made this unclear.

The young child in Burial 5 had a fractured skull, which had broken around the time of death and so the child may have died from a head injury. There was no evidence of the skull having been broken by a weapon or implement and the break could equally have been the result of accident or violence. The child did not live to heal after the break and did not show any other evidence of injury to the bones. There was little evidence of injury among the group, giving no particular indication of violence or dangerous working or living conditions for these people. In this case, the few examples of injury give no insight into medical treatment or care for the injured.

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[7] Note that these bones have been presumed to all be from the same individual.

Other Illness

Only illnesses that are chronic, those that can be withstood long enough to be long lasting, will show in the skeleton, while acute diseases that kill a person quickly do not allow time for the body to respond. Several of the people at Kawakawa Bay were suffering chronic disease before they died. The most obvious cases were the young man of Burial 4 and the child of Burial 8 East *a*. Both had systemic chronic disease that affected various parts of their skeleton. More subtle or isolated bone changes indicating disease were also found in Burials 1, 3, 5, and 6, however.

Many of the bone changes cannot be pinpointed to specific diseases and in-depth differential diagnosis has not been attempted. These bone changes do show that these people were affected by inflammation and infection, and in one case, iron deficiency anaemia (Burial 5).

In the case of Burial 4, tuberculosis is a possible cause of the severe lesion in the sacroiliac joint and other bone changes in his skeleton. Two men had bone changes that often result from a metabolic condition called Diffuse Idiopathic Skeletal Hyperostosis (DISH), though not sufficiently advanced that they could be positively diagnosed.

The adults had been healthy enough to grow tall and they had good teeth with little sign of growth disruption during childhood (apart from Burial 4), but there was a large number of children and infants who did not make it to adulthood, two of whom (B8 East *a* and B5) showed signs of chronic illness. Thus these skeletons give an impression of a society battling illness.

COFFINS

Wood Identification

Dr Rod Wallace from the University of Auckland identified the wood species from three of the coffins (see Appendix 3). Identifications were made by cutting cross-sections of the wood to look at underlying wood structure (Figure 86).

Two other coffins (B5 and B9) were made from kauri while the other (B2) was made from an exotic hardwood that was probably a species of oak (Table 7).

In addition, the coffin wood from B1 was also identified by Rod Wallace and Adam Hand as having a rimu base with kauri tongue and groove side boards (pers. comm. 2014).

Wood coffins from other nearby burials have not been identified by species, but kauri was identified for two coffins excavated at the Westney Denominational Cemetery during excavations by Best and Furey (2007:7).

Coffin Shape

Where the shape of the coffin could be identified during the excavations most of the coffins were of the typical tapered hexagonal form (Figure 87). This fits with the coffins described by Harlow et al. (2012). Two burials, B2 and B8, appeared to be the simpler rectangular coffins that were also identified during the 2006 excavations by Lawlor (reported by Littleton et al. 2006; Littleton et al. 2010).

Coffin nails were also found in the larger coffins (Figure 88).

Coffin B1 was the most intact of the coffins (Figure 89). Other elements of the coffin including three of the rope holders (Figure 90), fasteners or hinges (Figure 91) and small handles were also recovered (Figure 92).

Table 7. Wood identification from coffins

Burial	Sample	Species
1	Coffin wood base	Rimu
	Coffin wood sides	Kauri
2	Coffin wood general – Artefact #58 in Table 8	Exotic Hardwood – probably Oak sp.
5	Coffin base – Artefact #79	Kauri
	Coffin wood general – Artefact #76	Kauri
	Coffin back end – Artefact #78	Kauri
9	Coffin lid – Artefact #69	Kauri
	Coffin side – Artefact #75	Kauri
	Coffin base – Artefact #75	Kauri

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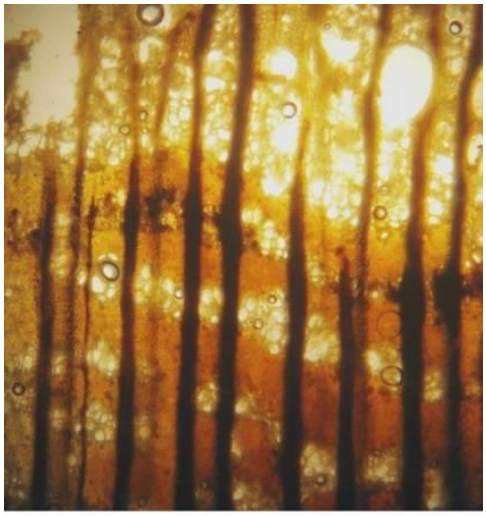
COFFINS, CONTINUED



Kawakawa Bay Coffin #2 S.58 Cross section

Kawakawa Bay Coffin #2 S.58 TL Section

Figure 86. Cross-section micrograph of coffin wood

Figure 87. B1 coffin after removal of skeleton, showing hexagonal shape

Figure 88. B1 coffin side board

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Figure 89. Coffin B1 fragments laid out – note the slight asymmetry. Scale = 1.2m

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Figure 90. Rope holder from B1 coffin

Figure 91. Metal fasteners or hinges from B1 coffin

Figure 92. Metal handles from B1 coffin

BURIAL ARTEFACTS

Carly Mailhot

Artefacts

A range of artefacts were recovered from the burials. They include ornaments as well as remains such as buttons from clothing. No cloth remains were recovered. Pendants made of shark teeth and pounamu were found with some burials. A metal box with a large cache of coins was also identified and the coins are described in detail below. Figure 93–Figure 106 illustrate some of the range of artefacts recovered in each of the burials and a catalogue of all artefacts found is provided in Table 8. Radiography of some of the artefacts was also undertaken as part of the recording.

Shark teeth pendants were found in amongst the koiwi associated with Burial 2 and Burial 8 (Figure 93 and Figure 105). Both are difficult to attribute to individuals as the burials contained multiple individuals. The pendant associated with Burial 8 appeared to have the remains of red sealing wax used as decoration. The use of sealing wax to achieve a red colour has been noted on other shark tooth pendants dating to the post-contact period, replacing colouring made from the red pigment kokowai mixed with animal fat, which did not adhere as well.[8]

The greenstone pendants or ear ornaments (kuru) are traditional high value items associated with chiefly status.[9] Three were recovered: one from Burial 3 (Figure 95), and two from Burial 6 (Figure 97 and Figure 98).

A metal lock plate was found partly corroded onto an ulna in Burial 7 (Figure 99). However, a much more significant find was a heavily corroded tin full of coins (Figure 100–Figure 101). The coins are described in detail below. The tin was too corroded to determine whether it had any marking on it. The coins were associated the individuals in Burial 7.

A white ceramic jar, often associated with ointment or toothpaste, was also found with the Burial 7 individuals. It had no particular markings (Figure 102). The lid was found some distance from the base.

Some strange lozenge shaped objects were also found here but their function is not known Figure 103. They may have been related to clothing, perhaps duffle or frock coat type toggles as illustrated on Figure 107, although this is speculative. Another item of unknown purpose from B7 was a metal tube or cylinder (Figure 108).

Buttons (Figure 94, Figure 96, Figure 104, Figure 106) were found in a number of the graves and are assumed to be associated with the original clothing buried with the individuals. They were made from shell, glass, bone and possibly wood. None had any distinctive markings.

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[8] http://collections.tepapa.govt.nz/object/191234
[9] http://www.teara.govt.nz/en/object/7682/kuru-ear-pendant

Figure 93. Artefact #55 shark tooth pendant from Burial 2 (cm scale)

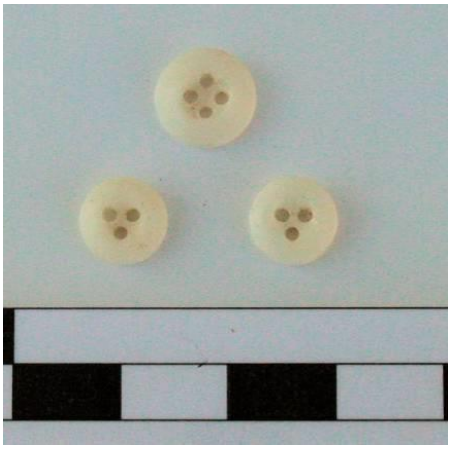

Figure 94. Artefact #13 glass buttons from Burial 3 (cm scale)

Figure 95. Artefact #14 greenstone pendant from Burial 3

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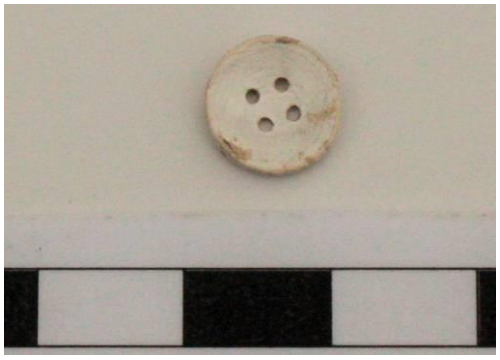

Figure 96. Artefact #77 shell button from Burial 5 (cm scale)

Figure 97. Artefact #21 greenstone pendant from Burial 6

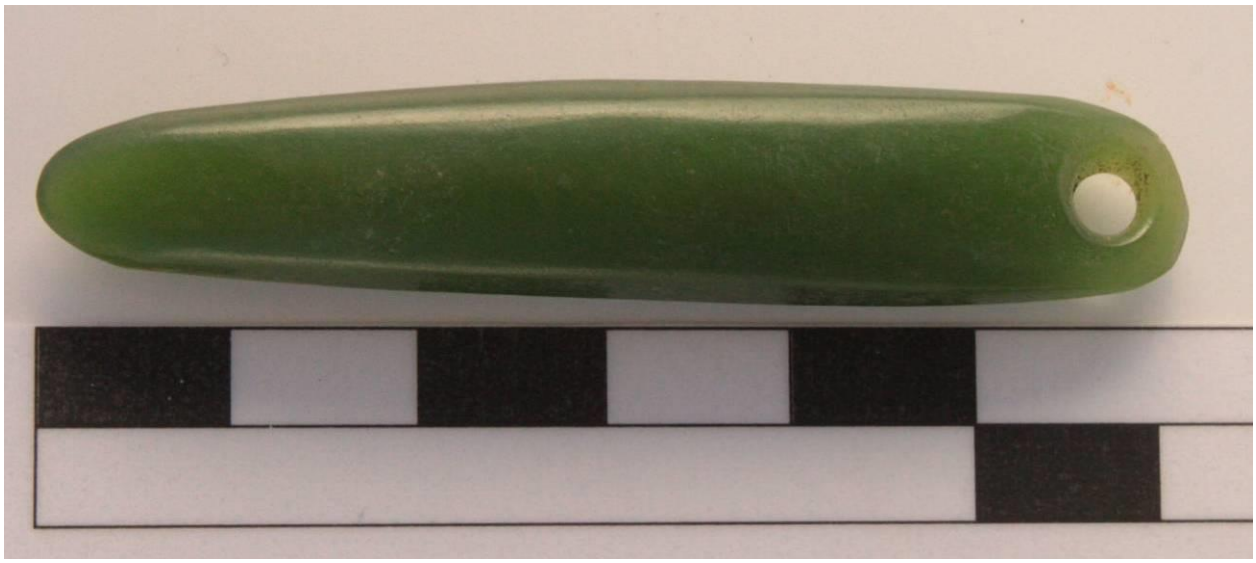

Figure 98. Artefact #27 greenstone pendant from Burial 6

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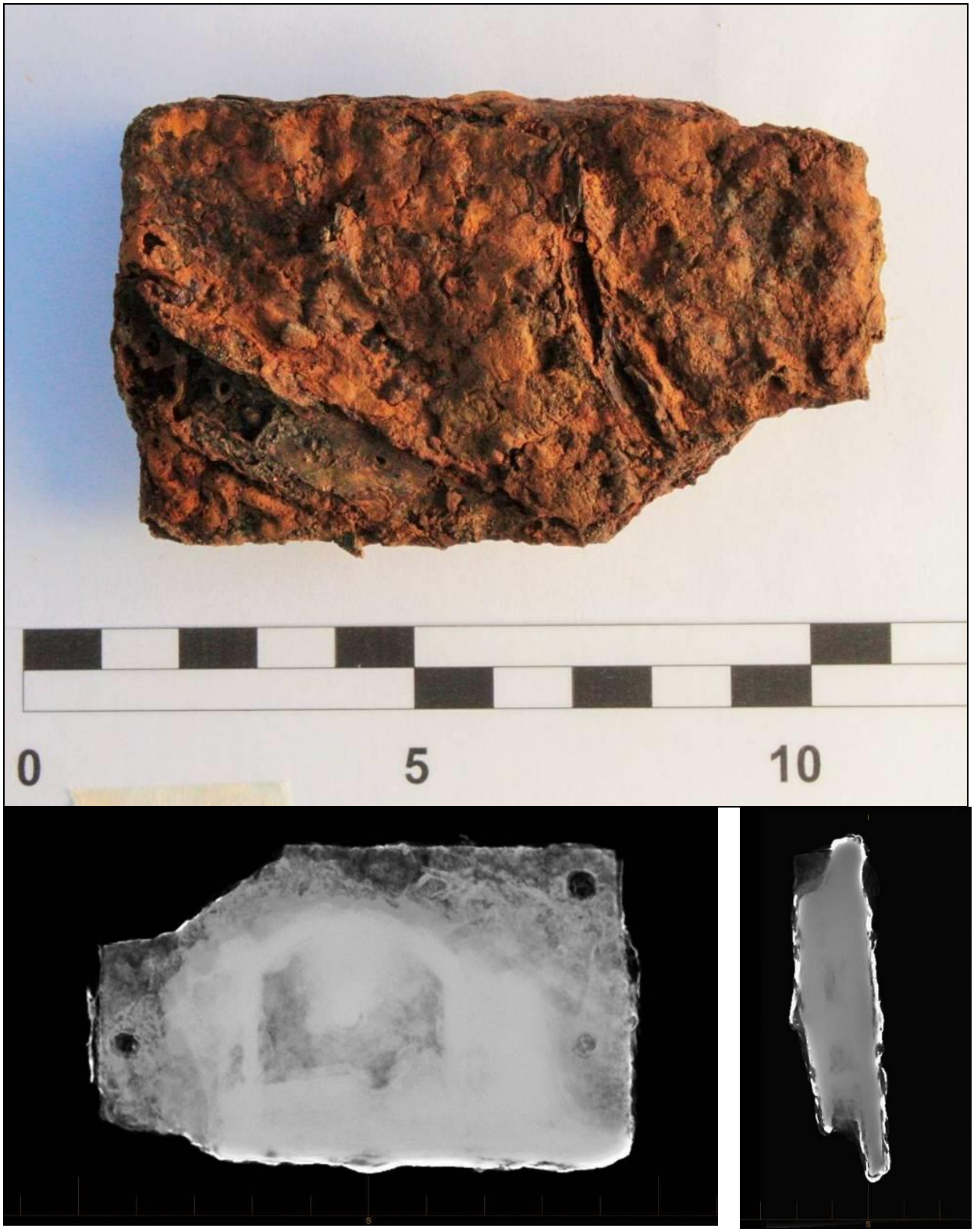

Figure 99. Artefact #48 lock plate from Burial 7 (flat and side radiographs shown below)

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BURIAL ARTEFACTS, CONTINUED

Figure 100. Artefact #37 metal box containing coins from Burial 7

Figure 101. Artefact #37 coins in metal box from Burial 7

Continued on next page

Figure 102. Artefact #38 ceramic pot/jar from B7 (lid and base found separately)

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Figure 103. Artefacts #40, 45, 46 lozenge-shaped objects, possibly toggles, from B7 (below: radiograph)

Figure 104. Artefact #47 bone button from B7

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BURIAL ARTEFACTS, CONTINUED

Figure 105. Artefact #50 shark tooth with red sealing wax from Burial 8

Figure 106. Artefact #65 bone button from Burial 9

Figure 107. View of toggles on uniform from mid to late 19th century

Unidentified man, seated, in military uniform. Ref: 1/4-006787-G. Alexander Turnbull Library, Wellington, New Zealand. http://natlib.govt.nz/records/23176024

Figure 108. Artefact #39 metal tube/cylinder from B7

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Table 8. List of artefacts from burials (excluding coins)

Artefact	Context	Date	Material	Description and Comments	Count	Dimensions
1	B1		wood	coffin; includes base, side panels, rope holders (?); when reconstructed it appears coffin was not symmetrical – one side has larger side panel on top of smaller side panel, while other side is opposite, also one side shows evidence of tongue-and-groove, while other does not	~13 'main' pieces; 50+ medium to small pieces	Piece 1: 23 x 7.5 x 1 cm; Piece 2: 48 x 28 x 2 cm; Piece 3: 45 x 29 x 2 cm; Piece 4: 152 x 19 x 2 cm; Piece 5 (side panel with groove): 55 x 11.5 x 2 cm ; Piece 6: 153 x 12 x 1.5 cm; Piece 7: 152 x 18 x 2 cm; Piece 8 (base): head 50 x shoulder 50 x body 148 x foot 46.5 cm x 4 cm thick; Piece 9: 55 x 2.5 x 1.5 cm; Pieces 10, 14, 15: 16 x 5 x 2 cm, hole 1.5 x 3 cm; Piece 11: 82 x 12 x 2.5 (part of lid); Piece 12 (part of lid): 154 x 16 x 2.5 cm; Piece 13: 51 x 18.5 x 2 cm
2	grave fill above B1		stone	possible hammerstones from fill above coffin	2	12 x 6 x 5 cm; 9 x 5.5 x 3 cm
3	B1		metal	corroded iron nails; can see wood grain in the 2 larger pieces	4	9 x 3.5 x 2 cm; 8 x 2.5 x 2.5 cm; 5 x 3.5 x 3 cm; 4 x 2 x 2 cm
4	B4		metal	corroded iron nails of various shapes and sizes (straight, L-shaped, L-shaped + straight); heads all seem to be oval-shaped; body looks (maybe) square, but hard to tell since they are so corroded	55	(sample) Nail 1 (straight): head 1 x 0.75 cm body 2.5 cm long 0.5 cm wide; Nail 2 (straight): head 1 x 1 cm body 6 cm long 0.75 cm wide; Nail 3 (L-shaped) head 0.75 x 0.75 cm; body top of "L" 3 x 0.5 cm bottom of "L" 2 x 0.5 cm
5	B4 near right forearm		metal	corroded iron nails recovered from near right forearm; same general types and sizes as Sample #4, but also some unidentifiable fragments	7	(see above)
6	B4 under spine		metal	corroded iron nails recovered from beneath spine; similar to Samples #4 and #5	4	(see above)
7	B4 amongst foot bones	5/09/2014	metal	corroded iron nails recovered from amongst foot bones; similar to Samples #4, #5, and #6	2	(see above)
8	B1		metal	corroded iron nails (similar to Samples #4-7) and larger pieces of corroded iron that appear	14	handles: 10 cm x 5 cm; triangular pieces: 22 x 22 x 10 cm

Artefact	Context	Date	Material	Description and Comments	Count	Dimensions
				to be 2 handles, 2 triangular-shaped pieces w/ 2 nails (?) protruding from centre, and 2 unidentifiable pieces		
9	B3		metal/wood	corroded iron nail and 2 small bits of (coffin) wood	1 nail + 2 wood = 3 total	
10	B3		metal	corroded iron nails and flakes; nails mostly straight, some with oval heads, some with round heads; relatively short bodies	50	(sample) flake: 4 x 3.5 cm; nail: ~3.5 cm long, oval head: 1.75 x 0.75 cm, round head: 0.75 cm diameter
11	B3 south wall of coffin, 40 cm from head		metal	corroded iron flakes and a nail from the south wall of the coffin, about 40 cm from head; shape of nail head not determined	4	(largest) Flake: 4 x 3 cm; Nail: 3 cm long
12	B3 head area		metal	corroded iron flakes from head area	2	
13	B3		glass	white opaque glass buttons found near right chest area; button 1 has 4 holes, buttons 2 & 3 have 3 holes	3	Button 1: 9.58 mm dia, 2.67 mm thick, 2.84 mm width of lip, 4.04 mm dia of central depression; hole 1: 1.17 mm dia, hole 2: 1.16 mm dia, hole 3: 1.18 mm dia, hole 4: 1.17 mm dia
						Button 2: 8.25 mm dia, 2.69 mm thick, 2.82 mm width of lip, 3.21 mm dia of central depression; hole 1: 1.19 mm dia, hole 2: 1.06 mm dia, hole 3: 1.08mm dia
						Button 3: 8.26 mm dia, 2.80 mm thick, 2.70 mm width of lip, 3.31 mm dia of central depression; hole 1: 1.14 mm dia, 0.91 mm dia, 1.02 mm dia
14	B3		greenstone	long cylindrical shaped greenstone pendant w/ tapered end and drill hole (opposite tapered end); found behind neck of B3	1	length: 52.13 mm; width at top (drill-hole) end: 8.10 mm; width at centre: 13.34 mm; thickness at top: 5.41 mm; thickness at centre; 9.94 mm; dia of middle of drill hole: 3.94 mm; opening on side A: 6.18 mm; opening on side B: 6.37 mm
15	B3		metal	corroded iron, mostly nails with some flakes; nails are as in Sample 11; one nail is hardly corroded at all – maybe not iron?	50	
16	B3	4/10/2014	metal	corroded iron sheet fragments found over right coffin shoulder wall		4.5 cm x 3.0 cm
17	B3		metal/wood	corroded iron nails and wood found at head of coffin; some of the nails have flat ends (?),	7 pieces metal + 2 pieces wood = 9 total	nail example: 4.0 cm (total length of nail) x 0.75 cm (width of body)

Artefact	Context	Date	Material	Description and Comments	Count	Dimensions
				heads not identifiable		
18	B3 ("feature 4"?)		metal	corroded iron nails from top/walls; 1 L-shaped nail, the rest straight; some flat-tipped, some with pointed tips; heads all seem to be oval	9	nail example: 3.5 cm long, head 1.5 cm x 1.0 cm
19	B3		wood	small wood pieces from (1 inch) sieving from head area	~ 30	
20	B6 left hand		metal	corroded iron nail found w/ left hand; head appears round; protrusion at bottom	1	2.0 cm long; 0.5 cm dia of body; 0.75 dia of head; 1.0 cm length of protrusion at bottom
21	B6 left hand		greenstone	greenstone pendant; long teardrop-shaped; drill hole at more bulbous end (v. similar to other greenstone pendants found at this site)	1	length: 61.29 mm; width at top: 9.09 mm; width at centre: 15.79 mm; thickness at top: 4.12 mm; thickness at centre: 9.47 mm; dia of drill hole in middle: 3.72 mm, Side A dia: 5.56 mm, Side B dia: 5.56 mm
22	B6 left hand		metal	corroded iron nails and 1 unidentifiable chunk	~ 10	
23	B6 next to left knee		metal	corroded iron nail found next to the inside of the left knee; L-shaped with round head	1	head of nail: 1.0 cm dia; vertical body: 3.25 cm long 0.5 cm wide; horizontal body: 1.5 cm long 0.75 cm wide
24	B6 pelvis/sacrum area		metal	corroded iron nails from the pelvis/sacrum area; includes L-shaped and straight nails; possibly square heads	7	
25	B6 lumbar area	21/5/2014	metal	corroded iron nails found with lumbar vertebra; stuck to piece of wood (?); oval head	1	head of nail: 0.75 x 0.5 cm; total length of nail: 5.0 cm; width of body: 0.5 cm
26	B6 thoracic verts	21/5/2014	metal	corroded iron nail found with thoracic vertebra	1	
27	B6 mandible	21/5/2014	greenstone	greenstone pendant from under right side of mandible; long teardrop-shaped with drill hole at more bulbous end	1	length: 60.78 mm; width at top (drill-hole) end: 9.45 mm; width at centre: 11.45 mm; thickness at top: 3.48 mm; thickness at centre: 8.39 mm; dia of middle of drill hole: 3.43 , Side A dia of drill hole: 5.29 mm, Side B dia of drill hole: 5.28 mm
28	B6 right hand		metal	corroded iron nail found with right hand; possibly oval head	1	4.0 cm long (head too corroded to measure)
29	B6 head area		metal	corroded iron nails found in sievings of head area; shapes not identifiable	2	
30	B4		metal	small, green metal (i.e. brass?) nails/tacks still stuck in bits of wood; round head	5	head: 0.75 cm dia; length: 1.75cm
31	B1	26/5/2014	stone	possible stone artefact? (was in w/ metal)	1	4.5 cm x 4.5 cm x 1.5 cm
32	B3	26/5/2014	fish bone	fish bone found in metal bag (Sample #10 and	2	

Artefact	Context	Date	Material	Description and Comments	Count	Dimensions
				18)		
33	B3	26/5/2014	charcoal	charcoal pieces found in metal bag (Sample #10)	13	3 cm x 1 cm x 0.5 cm; 2 cm x 1.5 cm x 1.5 cm; 1.5 cm x 1.25 cm x 1.25 cm
34	B3	26/5/2014	wood	coffin wood from other B3 sample bags (Samples #10 and 15)		
35	B3	26/5/2014	charcoal	charcoal piece found in nail bag (Sample #18) from top/walls of B3		similar size to those from Sample #33
36	B6	27/5/2014	metal	corroded iron nails from bag labelled "Nails & ?" which had soil, bone fragments, and nails; nails very corroded	2	
37	B7 outside coffin by trench wall	27/5/2014	metal	corroded metal box with coins inside; box itself has almost completely disintegrated – fell apart when removed from plastic sample bag	1 box + 31 coins = 32	
38	B7 "F12" (?) West	4/03/2014	ceramic	ceramic pot/jar with lid, found separately (toothpaste or ointment jar); no decoration; small mark like Roman numeral I (but with lines on top and bottom) on underside of pot; inside the base surface undulates slightly; small slightly puckered dot inside centre of lid; crazing of glazing all over vessel and lid; some nicks but in generally good condition	1 lid + 1 vessel = 2 count	lid: 75.03 mm dia outside, 61.87 mm dia inside, 5.34 mm thick, 15.9 mm in height; pot: 72.97 mm dia at bottom outside, 64.15 mm dia at inset for lid, 51.25 mm dia inside, 15.86 mm depth inside
39	B7 west end		metal	metal tube/cylinder with lip and large opening at one end; closed except small hole at other end, small hole has metal jutting out around the edge of the hole as if made by something punching through the metal; at c.33 mm from top of lip body is bent inwards on one side	1	87.30 mm total length; 8.61 mm lip length; 24.6 mm lip dia; 19.53 mm body dia; 15.60 mm inside diameter (appears to be uniform inside); 17.93 mm bottom dia; 5.90 mm dia of hole on bottom
40	B7 west end	4/07/2014	unknown	bullet- or lozenge-shaped object; appears to be two different materials on the inside and outside; inside is greenish-grey clayey-looking material (feels soft and malleable like clay when wet); outside is yellowish and harder, crumbling off in some spots, and has striations running the length of the object; the yellowish outer layer has crumbled away to expose the tip and part of the body of the inner greenish-grey material	1	39.97 mm in length; 18.00 mm dia at base
41	B7 outside coffin area	4/04/2014	wood (?)	originally thought to possibly be leather, looks more like wood once cleaned; one side is quite smooth; grain visible on other side	1	35.56 mm in length; 18.01 mm wide; 2.13 mm thick

Artefact	Context	Date	Material	Description and Comments	Count	Dimensions
42	B7 outside coffin area	4/08/2014	bone	sheep or pig bone found amongst human bones outside coffin area of B7	1	39.41 mm x 20. 82 mm x 21.79 mm
43	B7		wood/metal	corroded iron nail corroded onto) wood; nail head is oval; body seems to be square/rectangular	1	wood: 33.37 mm long, 64.53 mm wide, 6.25 mm thick; nail: 42.23 mm long, head: 16.34 mm x 12.69 mm
44	B7 above natural stratum		wood	pieces of wood possibly associated with B7 but thought to probably be a natural deposit as situated right on top of natural stratigraphy and irregularly shaped	5	(samples – largest and smallest) 70.69 x 34.14 x 12.33 mm; 20.30 x 11.66 x 8.45 mm
45	B7 outside coffin area		unknown / possibly metal	same as Sample #40, but the yellowish white outer layer has crumbled away on about 3/4 of the object	1	49.15 mm long; 15.57 mm wide at middle (including shell); 8.59 mm wide at bottom (w/o shell)
46	B7 outside coffin area		unknown / possibly metal	same as Samples #40 and 45, but looks a little shorter and fatter; also not quite same shape as other two – not as tapered and the end looks crushed	1	29.08 mm long; 18.64 mm wide
47	B7	29/5/2014	bone? horn? wood?	Brown button that has split into two pieces, roughly separating the back from the front; has 4 holes which are not perfectly centred; there are 2 lines that run between all the holes, i.e. separating them; some slight discoloration in one small area on front of button; where the 2 lines intersect (in the centre of the button), there is a tiny pit; the same lines and pit are visible on the back of the button; on the cross-sections (where the button has split into two pieces) fine striations are visible; button was dislodged from soil when cleaning a metal lock plate that had corroded onto an ulna (Sample #48).	1	13.41 mm dia; 2.00 mm thick at edge; hole diameters: 1.51 mm, 1.32 mm, 1.47 mm, 1.44 mm
48	B7	4/04/2014	metal	corroded iron in rectangular lock plate; bits had have fallen off; sas originally corroded onto an ulna.	1	93.43 mm long; 54.32 mm wide; 33.61 mm thick
49	B7 outside coffin area	4/07/2014	fish bone	small fish bone	1	18.57 x 2.96 x 1.55 mm
50	B8 East (base of cluster)	4/10/2014	shark tooth	shark tooth found at base of B8 East cluster of children skeletal remains; tooth is long, thin and pointed; vertical drill hole through the front part of the root; bright red powdery substance (though had been waxy/greasy	1	highest root to tip: 42.12 mm; lowest root to tip: 36.36 mm; distance between outer edge of roots: 19.28 mm; distance between inner edge of roots: 13.79 mm; width of tooth just

Artefact	Context	Date	Material	Description and Comments	Count	Dimensions
				when first exposed) – remains of sealing wax – all over the root, with a lighter dusting extending just below the root onto the top enamelled part of tooth.		below root: 8.97 mm; thickness of tooth just below root: 6.28; drill hole diameter: 3.21 mm
51	B8 East (base of cluster)	4/10/2014	red powder (mixed with sand)	same red residue as found on shark tooth (Sample #50), probably from decomposition of the red sealing wax on the shark tooth		
52	B8 (next to B8 East, not in grave cut)	4/09/2014	shell	shell fragment with hole; very worn bivalve with hole near edge of shell; probably natural	1	27.08 x 13.89 x 2.51 mm; hole diameter 3.65 mm
53	B8		fish bone	fish bone fragments found with B8 human skeletal remains	c.20	
54	B2		worked bone	roughly triangular shaped worked bone with bright red powdery substance on it (probably same as the sealing wax residue on B8's shark tooth)	1	29.81 x 13.31 5.52 mm
55	B2		shark tooth	drilled shark tooth; bluish tint to tooth (possibly staining?); long and thin with convex curve; drilled vertically between roots just above enamel	1	highest root to tip: 36.83 mm; lowest root to tip: 31.51 mm; distance between outer edge of roots: 18.70 mm; distance between inner edge of roots: 8.57 mm; hole diameter 2.48 mm
56	B2		wood	pieces of coffin wood, various sizes	c.13	largest piece: 95.28 x 24.06 x 3.65 mm; smallest 13.8 x 10.49 x 1.88 mm
57	B2		wood	pieces of coffin wood, various sizes	3	36.54 x 17.51 x 20.47 mm
58	B2		wood	pieces of coffin wood, various sizes	6	largest: 91.89 x 48.56 x 25.38 mm; 48.53 x 19.98 x 12.77 mm
59	B2		metal/wood	various shapes and sizes of corroded iron, some corroded onto wood; metal includes nails and unidentifiable pieces; only two nails are identifiable, one has round head and round body, one has triangular (?) head, round body	c.30	sample nail measurements: nail 1 40.22 mm long, 4.63 mm width of body, head 7.31 mm dia; nail 2 56.65 mm long, 4.53 mm width of body, head 10.01 mm width
60	B2		organic (rope? string? plant?)	possibly woven string/rope; brownish green in colour, but probably this is from being wet in ground; possibly completely natural	1	120.58 x 7.15 x 0.75 mm
61	B5		metal	found on baulk of head of B5, post, etc.; 2 not very corroded nails with some wood; metal not determined; round heads with square bodies	2	Nail 1: 27.73 mm long, 2.48 mm width of body, 8.23 mm dia of head; Nail 2: 31.79 mm long, 2.44 mm width of body, 7.55 mm dia of head
62	B5		wood	circular piece of wood from coffin base	1	40.43 x 33.82 x 10.61 mm

Artefact	Context	Date	Material	Description and Comments	Count	Dimensions
63	B5		metal/wood	(similar to Sample #61); 2 not very corroded nails (type of metal not identified); round heads and square body	2	33.15 mm long; 2.49 mm width of body; 8.85 mm dia of head
64	B9		wood	narrow piece of wood showing possible signs of being worked – one side is very smooth; possibly coffin wood	1	37.22 x 6.67 x 8.26 mm
65	B9		bone (button)	brown button with 4 holes; small bits have broken off; two holes eroded	1	17.63 mm dia of button; 3.39 mm dia of biggest hole (eroded); 2.00 mm dia smallest hole (intact); 3.18 mm thickness at edge; 2.5 mm width of lip; 11.59 dia of central depression
66	B9		fish bone	Small fish bone	1	32.66 x 4.2 x 3.04 mm
67	B9		wood	Small pieces of wood (from metal bag)	10	39.62 x 13.45 x 5.22 mm
68	B9		metal	corroded iron nails; shape of head or body not identifiable	23	Nail 1: 77.85 mm long, 6.88 mm width of body, 9.79 dia of head (can't tell shape of head or body); Nail 2: 49.65 mm long, 3.56 mm width of body, 8.61 mm dia of head (can't tell shape of head, square body)
69	B9		wood	coffin wood originally found stuck to ribs	13	98.17 x 64.93 x 13.57 mm; 44.22 x 9.37 x 3.29 mm
70	B9		charcoal	charcoal found in general artefact bag	2	fragmentary
71	B5		wood	small pieces wood	3	71.91 x 32.07 x 7.34 mm; 30.26 x 24.12 x 3.48 mm
72	B2 (trench?)		metal	silver coin; Reads: ONE SHILLING / 1846 / VICTORIA DEI GRATA / BRITANNIAR / REG / F /D	1	
73	B9		wood	coffin wood	10	largest: 66.39 x 10.92 x 3.0 mm
74	B7 (under infant skull)		metal	metal flakes recovered from just below infant skull in B7	10	largest: 27.59 x 22.8 x 2.86 mm
75	B9		wood	coffin wood; various sizes – 6 big pieces, 20+ small pieces; a few pieces still have nails	~30	55 x 16 x 1 cm (piece w/ nail); 26 x 8 x 1 cm (piece w/ nail)
76	B5		wood	small pieces of coffin wood; some (5) have nails; nails include round heads, some tinted green, some pink, some brown, bodies not determined; also at least one oval-shaped head with square body	~10 pieces wood, 5 of which have nails still attached	Piece 1 w/ greenish round head 5.4mm dia, wood measures 6.5 x 3 x 1 cm; Piece 2 round nail head 6.02 mm dia; Piece 3 (can't tell head or body type) 32.37 mm long; Piece 4 round nail head 5.67mm dia, 33.3 mm long (can't tell body type); Piece 5 oval nail head 6.44 x 7.0 mm, square body 32.52 mm long;

Artefact	Context	Date	Material	Description and Comments	Count	Dimensions
						Piece 6 round nail head (pinkish colour) 5.98mm dia, can't see length or body type
77	B5 (outside head end of coffin)		shell	shiny shell button (mother of pearl?); 4 buttonholes; no distinct lip/central depression; fragile and prone to crumble	1	9.44mm dia; 1.09 mm thickness; 1.0 mm hole dia
78	B5 (outside head end of coffin)		wood/metal	pieces of coffin wood with a nail still embedded in each piece; one piece has one nail with a round head and square body; nail is stained/corroded pinkish-reddish colour; the other piece has one nail that is stained/corroded a greenish colour, round head, square body	2	Piece 1: head 5.53 mm dia, body 31.38 mm long; Piece 2: head 6.18 mm dia, 32.98 mm long
79	B5		wood/metal	coffin base w/ nails; nails all appear to have round head and square body, except 1 has a round head but is bent at a ~45 degree angle to body just below head; all the nails apart from the exception are firmly embedded in the wood; on only one could length be determined (see measurements); a few of the pieces of wood are clearly corner pieces held together with the nails	at least 15 nails in 10 pieces of wood	nail example: round (greenish) head 6.2 mm dia, square body 32.64 mm long

COINS

Simon Best

Burial 7

One of the burials, B7, contained at least two items deliberately placed in the coffin/grave at the time of interment. These were a small metal box containing 31 coins, and a ceramic container and lid (separate) resembling a toothpaste/ ointment pot. Six individuals were found in the grave: four adults and two infants.

The coin container was found in the upper body area at the east end of the grave cut, among the crania and other bones, but could not be associated with any one of these individuals. Another burial had been interred over this, the base of the coffin resting on the lower skeletal material.

Coin Assemblage

The 31 coins were found in a metal container resembling a 19th century matchbox. The only secure measurement for this was the width, of 35mm, while the length was assessed by the excavators as c.120mm.

All coins were heavily encrusted, and required cleaning to aid in identification and assessment of original condition.

All were silver, dating from between 1817 and 1842, and came from five countries:

- England (25)
- Mexico (2)
- Bolivia (2)
- Peru (1) and
- France (1)

Photographs of the individual coins are shown in Figure 109–Figure 119.

Coin 6

REPUBLICA MEXICANA/8R.Z^{S}.1836.0.M.10D^{S}.20G (38mm dia)

Coin 4

REPUBLICA MEXICANA/8R.G^{A} 1841.M.G.10D^{S}.20G^{B} (38mm dia).

Coin 5

LIBRE POR LA CONSTITUCION BOLIVAR/REPUBLICA BOLIVIANA TS.8S.1830.I (38mm dia).

Figure 109. Coins from Burial 7

Continued on next page

Coin 15

LOUIS PHILIPPE I ROI DES FRANCAIS DOMARD.F/5 FRANCS 1842 (37mm dia).

Coin 7

FIRME Y FELIZ POR LA UNION/REPUB PERUANA ??.1R.M.B.1840 (21mm dia)

Coin 24

LIBRE POR LA CONSTITUCION BOLIVAR/REPUBLICA BOLIVIANA tps 2S.1830.J.L. (Dia. 26mm)

Figure 110. Coins from Burial 7

Continued on next page

Coin 1

GEOR:III D:G: BRITT:REX F:D: 1817/HONI.SOIT.Q.MAL.Y.PENSE (23mm dia)

Coin 28

GEOR:III D:G: BRITT:REX F:D: 1819//HONI.SOIT.Q.MAL.Y.PENSE (23mm dia)

Coin 2

GEOR:III D:G: BRITT:REX F:D: 1820/HONI.SOIT.Q.MAL.Y.PENSE (23mm dia)

Figure 111. Coins from Burial 7

Continued on next page

Coin 29

GEOR:III D:G:BRITT:REX F:D: 1820/HONI.SOIT.Q.MAL.Y.PENSE (23mm dia)

Coin 13

GEORGIUS IIII D:G: BRITANNIAR:REX F:D:/HONI.SOIT.QUI.MAL.Y.PENSE ANNO 1824 (Dia.23mm)

Coin 25

GEORGIUS IIII D:G: BRITANNIAR:REX F:D:/HONI.SOIT.QUI.MAL.Y.PENSE ANNO 1824 (Dia.23mm)

Figure 112. Coins from Burial 7

Continued on next page

Coin 14

GEORGIUS 1V DEI GRATIA 1825/BRITANNIARUM REX FIDEI DEFENSOR (Dia.23mm)

Coin 27

GEORGIUS 1V DEI GRATIA 1825/ BRITANNIARUM REX FIDEI DEFENSOR (Dia.23mm)

Coin 26

GEORGIUS 1V DEI GRATIA 1826/ BRITANNIARUM REX FIDEI DEFENSOR (Dia.23mm)

Figure 113. Coins from Burial 7

Continued on next page

Coin 30

GEORGIUS 1V DEI GRATIA 1826/ BRITANNIARUM REX FIDEI DEFENSOR (Dia.23mm)

Coin 19

GEORGIUS 1V DEI GRATIA 1826/ BRITANNIARUM REX FIDEI DEFENSOR (Dia.23mm)

Coin 20

GEORGIUS 1V DEI GRATIA 1826/ BRITANNIARUM REX FIDEI DEFENSOR (Dia.23mm)

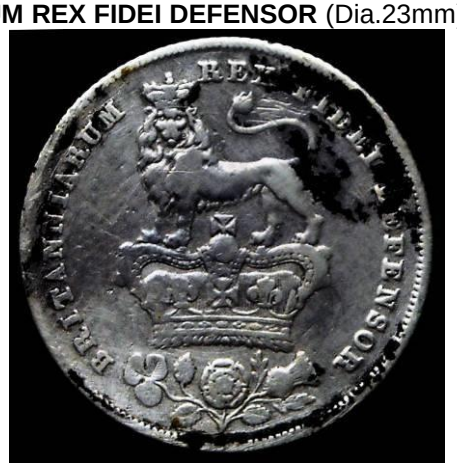
Figure 114. Coins from Burial 7

Continued on next page

Coin 21

GEORGIUS 1V DEI GRATIA 1826/ BRITANNIARUM REX FIDEI DEFENSOR (Dia.23mm)

Coin 22



GEORGIUS 1V DEI GRATIA 1826/ BRITANNIARUM REX FIDEI DEFENSOR (Dia.23mm)

Coin 18

GEORGIUS 1V DEI GRATIA 1826/ BRITANNIARUM REX FIDEI DEFENSOR (Dia.23mm)

Figure 115. Coins from Burial 7

Continued on next page

Coin 9

GEORGIUS 1V DEI GRATIA 1826/ BRITANNIARUM REX FIDEI DEFENSOR (Dia.23mm)

Coin 12

GEORGIUS 1V DEI GRATIA 1826/ BRITANNIARUM REX FIDEI DEFENSOR (Dia.23mm)

Coin 3

GEORGIUS 1V DEI GRATIA 1826/ BRITANNIARUM REX FIDEI DEFENSOR (Dia.23mm)

Figure 116. Coins from Burial 7

Continued on next page

Coin 31

GEORGIUS 1V DEI GRATIA 1829/ BRITANNIARUM REX FIDEI DEFENSOR (Dia.23mm)

Coin 10

GEORGIUS 1V DEI GRATIA 1829/ BRITANNIARUM REX FIDEI DEFENSOR (Dia.23mm)

Coin 16

GULIELMUS IIII D:G: BRITANNIAR:REX F:D:/ONE SHILLING 1834 (Dia.23mm)

Figure 117. Coins from Burial 7

Continued on next page

Coin 23

GULIELMUS IIII D:G: BRITANNIAR:REX F:D:/ONE SHILLING 1834 (Dia.23mm)

Coin 17

GULIELMUS IIII D:G: BRITANNIAR:REX F:D:/ONE SHILLING 1835 (Dia.23mm)

Coin 8

GULIELMUS IIII D:G: BRITANNIAR:REX F:D:/ONE SHILLING 1835 (Dia.23mm)

Figure 118. Coins from Burial 7

Continued on next page

Coin 11

GULIELMUS IIII D:G: BRITANNIAR:REX F:D:/ONE SHILLING 1835 (Dia.23mm)

Figure 119. Coin from Burial 7

Coin Cache Date Distribution

The date distribution of the coins is shown in Figure 120. The English coins were shillings, dating from 1817 to 1835 – the reigns of George III, George IV and William IV.

Of the remaining six, two were Mexican 8 reales (1836, 1841), a Bolivian 8 soles (1830) and 2 soles (1830), a Peruvian 1 real (1840) and a French 5 franc piece (1842).

Wear, as might be expected, was generally greater with age, but also varied within years. None of the coins showed signs of any deliberate alteration, such as holes or marks which might have indicated a secondary use such as adornment.

English Shillings

While the date distribution of these, as shown in Figure 121, appears to be in clusters about five years apart, this is perhaps best explained by the quantities minted and sample size. In two years, 1822 and 1828, none were produced, while for those years where less than about two million were struck it appears that few may have reached these shores (Figure 122).

The exception appears to be for the years between 1836 and 1840, where considerable numbers were minted, but none appear in the collection.

Continued on next page

South American and French Coins

Despite their generally later date, some of these exhibited more wear than a number of the earlier shillings. The Mexican coinage was known as dollars, and probably that from the other South American republics also.

Coin Usage in New Zealand

Whalers, sealers, flax and timber traders, deserters, ex-convicts and missionaries would have brought the first coins to the country after about 1800, with most of these from Australia. Although barter/exchange must have played a large part, it has been stated that currency of the day would also have been used – "gold and silver coins of any country" (Sutherland 1940:61).

Most of the coins were probably from England, but included pieces of eight and lesser silver coins from Spain and Spanish-American colonies, and after about 1825 similar currency from the new Southern American republics along the Pacific coast, including Mexico, Bolivia and Peru. Coins from France, Holland and Portugal were also in use (Matthews 2003:41; Sutherland 1940:61).

Shillings

Silver shillings were a common unit of trade in early 19th century British colonies, with specie shipped out from England for the local governments. In November 1826, for example, £20,000 of British silver minted that year arrived at Sydney in HMS *Success* (causing the local press to exclaim "The poor dollars will now certainly be driven off …") and shillings from this shipment are undoubtedly present in the B7 collection (*Colonial Times & Tasmanian Advertiser* 23 February 1827:3; *Hobart Town Gazette* 25 November 1826:2; *Sydney Gazette & New South Wales Advertiser* 29 November 1826:2).

Francs

Francs as legal tender are first mentioned in Australian newspapers in 1825, when they are included in coinage proposed for "the British Colonies" and valued at 4 shillings (*Hobart Town Gazette* 17 September 1825:4). Early visitors to New Zealand from France include two French-registered ships at the Bay of Islands in 1824 and 1827, Laplace in 1831, and between 1836 and 1840 50 French whalers at the Bay of Islands alone, 46 of these between 1838 and1840 (Richards and Chisholm 1992). Almost the entire French whaling fleet, about 60 vessels, is said to have been whaling in New Zealand waters between 1836 and 1845, with about 100 of their crew deserting in the 1840s (Belich 2001:138). Together with the settlement at Akaroa in 1839, and the French missionaries at Kororareka (Bishop Pompallier conducted a cash deal with trader Gilbert Mair in 1840 involving 7,476.30 francs (Sutherland 1939:82)), there are many routes by which French coins could have hopped ashore into the early trading networks here.

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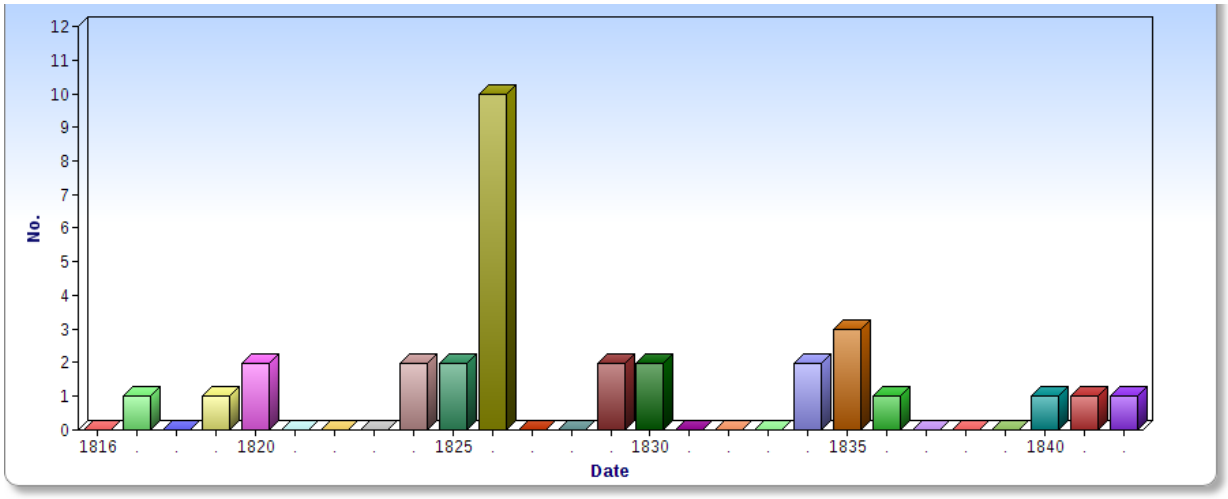

Figure 120. Date distribution of coins from B7

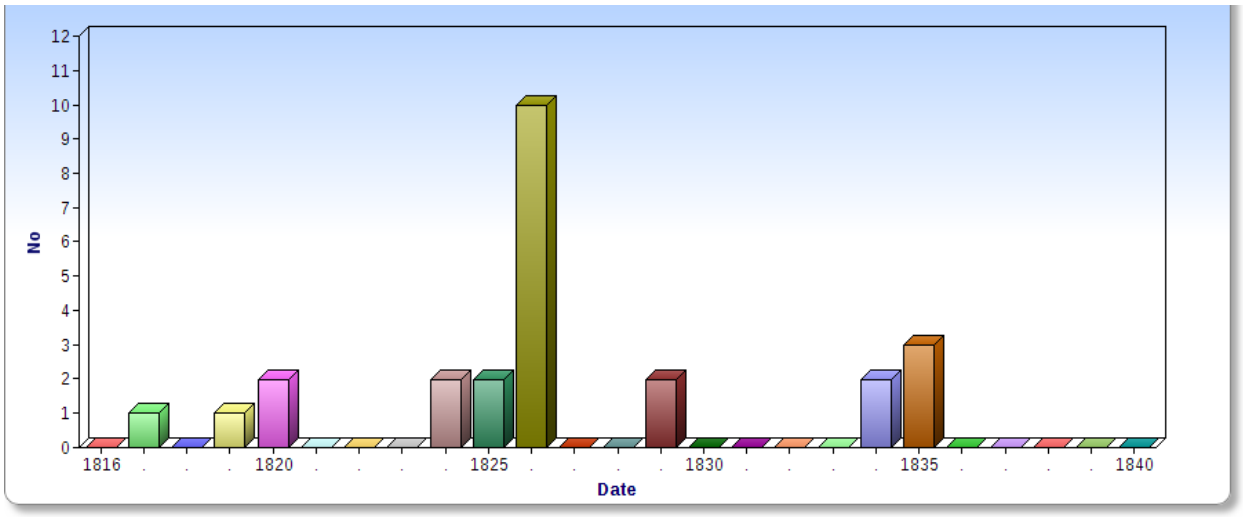

Figure 121. Date distribution of the English shillings from B7

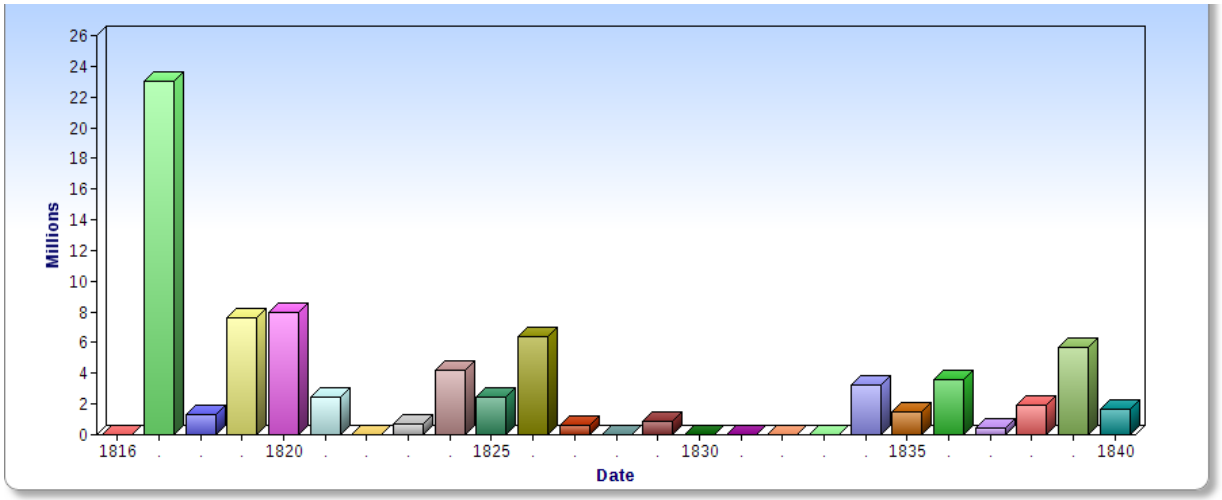

Figure 122. Quantities of shillings minted 1817-1840

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Dollars

Spanish dollars were currency in Australia from the early 1790s at least, joined by the Colonial or Holey dollar from 1813. The former were almost certainly on board the *Fancy* in late 1794, when she anchored for three months in the Waihou River for spars and flax. First known to have come ashore were coins from the *Boyd*, the vessel seized by Maori at Whangaroa in 1809, and initially worn by them as ornaments but later traded with visiting vessels for items such as fishhooks (Cruise 1974:314). Dollars, acquired through trade, were also paid by Maori to captains of visiting vessels as passage money to visit other parts of the country (H. Williams to J. Pratt November 10 1823:8).

Church Missionary Society records show that the currency was in regular use. Spanish dollars are identified in transactions by Henry Williams on at least three occasions, twice to whaling captains for supplies: in 1824 when he gave bills of exchange to the master of the *Marcus* from Sag Harbour, and in 1828 to Obed Starbuck of the Nantucket *Loper*; and in the latter year as wages to the carpenter Thomas King (H. Williams to J. Pratt July 9 1824:8, to D. Coates October 3 1828:2). Hard cash was also kept on the premises – a servant girl stole six dollars at Rangihoua in about 1823, and in 1827 Henry Williams buried 200 dollars in the garden of the Paihia Mission when he heard that a party of Ngapuhi were coming to town (Butler 1927:314; Williams 1961:40).

By the 1830s, according to Joel Polack, "The Spanish dollar is the favourite coin, as in all barbarous countries", with their value well appreciated by Maori, being described as among the "most valued and expensive material" (Polack 1976;183, 204). Mexican dollars are mentioned in Australian papers from 1830, and were undoubtedly circulating in New Zealand at that time or slightly later (*Hobart Town Courier* 20 February 1830:2). By the 1840s it was said that more Spanish (probably including South American) coins were in circulation in New Zealand than coins from Britain or New South Wales (Matthews 2003:41).

Blue Book returns for 1840-1850 record the official decline of foreign coin use in New Zealand. In 1840 these made up over 80% of the total, but four years later this had dropped to 11%. In 1847, when Public Record Offices, the Commissariat and banks refused to accept them, the quantity in circulation was "very small", in 1848 they had "nearly disappeared", and in 1850 "British coins only circulated in New Zealand" (Sutherland 1939:70-78). This latter is probably an exaggeration: Italian, French and Mexican coins dating to between 1853 and 1863 are in a collection held at Russell Museum, said to have been accepted across the counter from whalers by a local storekeeper (Item CFB78, Russell Museum).

Continued on next page

Dollars, *continued*

Early land deals are perhaps a good way to assess the era of dollar use, at least in the North Island. Turton records some 659 transactions involving money between 1831 and 1860, and dollars are involved in the first decade of this period, with one other instance three years later; "Spanish Dollars" are identified in seven of these (Turton 1877, 1878, 1882). CMS missionaries, as mentioned above, seem to have been on good terms with the Holy Dollar; no fewer than 15 of them, out of an ecclesiastical labour force of about 40, buying land with the coins.

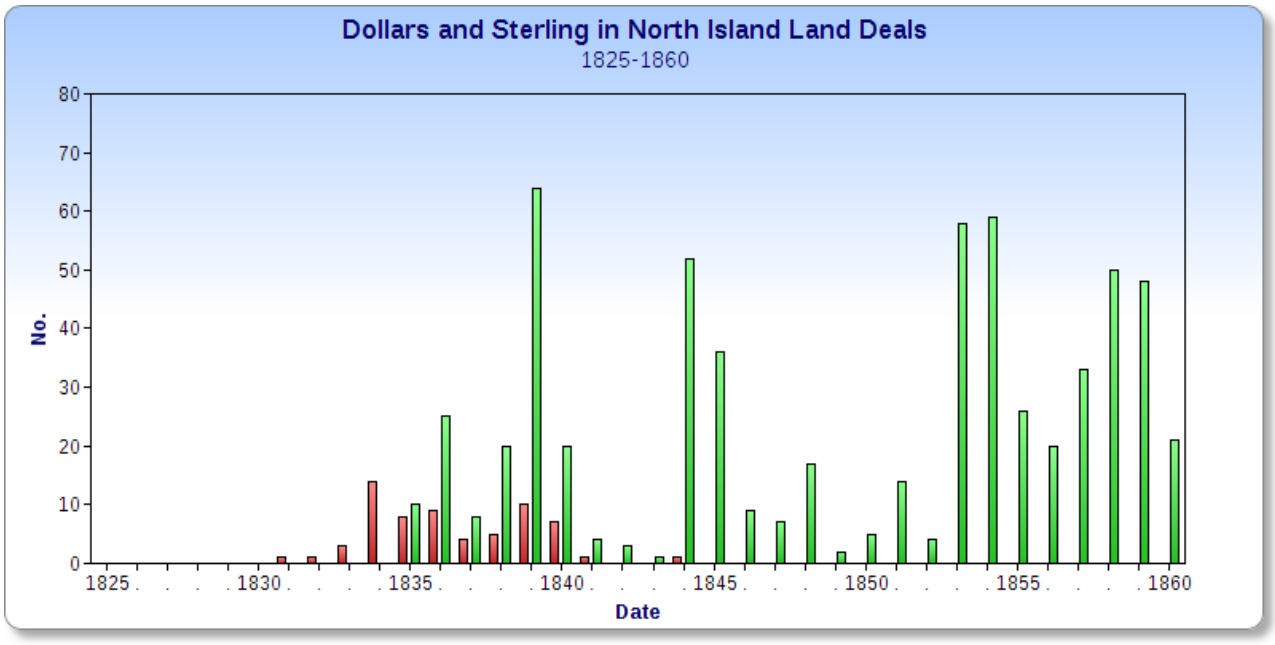

Figure 123. Dollars (red) and sterling used in North Island land deals from 1825 to 1860 (data from Turton 1877, 1878, 1882)

Contemporary Value

This section describes the possible contemporary value and purchasing power of the coins. Their total value in about 1842 would have been some 42 shillings and sixpence. The 'dollars' (8 reales and scudos) and the 5 franc piece were worth 4 shillings each, the quarter dollar 1 shilling, and the 1 real (presumably) about 6 pence (Sutherland 1939:72).

The relative purchasing power of the coin cache is difficult to assess. In 1841 the sum could buy various items: 42 issues of a Wellington newspaper, a couple of blankets, nearly 500 bricks, and almost 1½ sheep (*New Zealand Gazette & Wellington Spectator* 2 January 1841:4, 5 June:2, 9 October:3, 3 November:2).

Continued on next page

Contemporary Value, *continued*

It is just possible that the coins were part of a land deal (although probably not in the immediate area) as, for instance, the Government purchase of 22,000 acres in the Auckland district in 1840/1841 for about 1 shilling an acre, and in 1853 taking vacant possession of the 4,277 acre Ponui Island at about half that rate (Turton 1877:268-70, 286).

The Collection

It is possible to suggest some theories as to how the collection came about. Exotic explanations such as an overseas trip or trips are unlikely, since all the coins were legal tender in New Zealand. There seem to be two main possibilities – the coins were either acquired over a period of time, possibly for services/products rendered, or were a single payment. As has been mentioned above, the uneven distribution of the shillings can be explained by the availability of the coins in various years, not by any conscious choice through time. If, however, the collection was a single payment at some time in the early to mid-1840s, then the lack of shillings after 1835 is a problem, since sufficient had been minted in most of these years to have been available.

One of these, an 1842 shilling, was found during excavation of a burial in Kawakawa Bay in 2006 – its provenance described by the excavator as "from the surface fill of one grave" (Lawlor 2006) and by the author of the excavation reports as "on top of a nearby grave" and "on the surface of an adjacent burial" (Littleton 2006, Littleton et al. 2006). Thus the coin was not buried within the coffin itself, but deposited later, either during the latter stage of grave backfill or through non-associated post-burial activities or events in the immediate area.

Summary

The 31 silver coins may thus represent an accumulation down the years, or be the result of a single transaction. They may have accompanied the individual as a symbol of some important event or activity in their life, or perhaps as travel insurance for the next world. They could also have been a farewell gift from family or friends, although single coins placed in the coffin would seem more likely. It is also possible that this was a coin collection *per se* – the bright silver discs as fascinating as the dollars from the *Boyd* had been some 30 years earlier, when John Nicholas, one of Samuel Marsden's travelling companions, saw them at Whakatiwai "suspended from the necks of children" (Nicholas 1817:404). The answer will never be known.

Continued on next page

Summary, *continued*

Those few years before organised European settlement, when hard palms were crossed with silver from far-away places, have been described as "an interesting phase in the numismatic history of New Zealand" (Sutherland 1939:78). But behind the coins themselves are two peoples, searching for some common ground during the first quarter century or so of a troubled contact. The contents of the small metal box in Burial 7 at Taupo Bay provide a brief glimpse of an emerging nation.

Burial 2

An 1846 shilling (Figure 124) was found while excavating the disturbed burials in the pipe trench. It could not be provenanced to any one of these burials.

Figure 124. 1846 Shilling from Burial 2

RE-BURIAL

Process of Re-burial

Re-burial of the koiwi was undertaken under the supervision of representatives of Ngati Paoa and Ngai Tai ki Tamaki in accordance with appropriate tikanga in a scheduled urupa further along the Kawakawa Bay Coast Road (Figure 125 and Figure 126).

The scheduled urupa[10] was geophysically surveyed using GPR prior to the re-burial and areas that did not contain anomalies indicative of burials were identified (Figure 125). The area to the south-east was chosen to minimise the likelihood of disturbing of any earlier burials, and a digger was used to excavate the ground down to around 1m under iwi supervision.

Koiwi were reinterred in waka harakeke at a dawn ceremony on 27 July 2014.

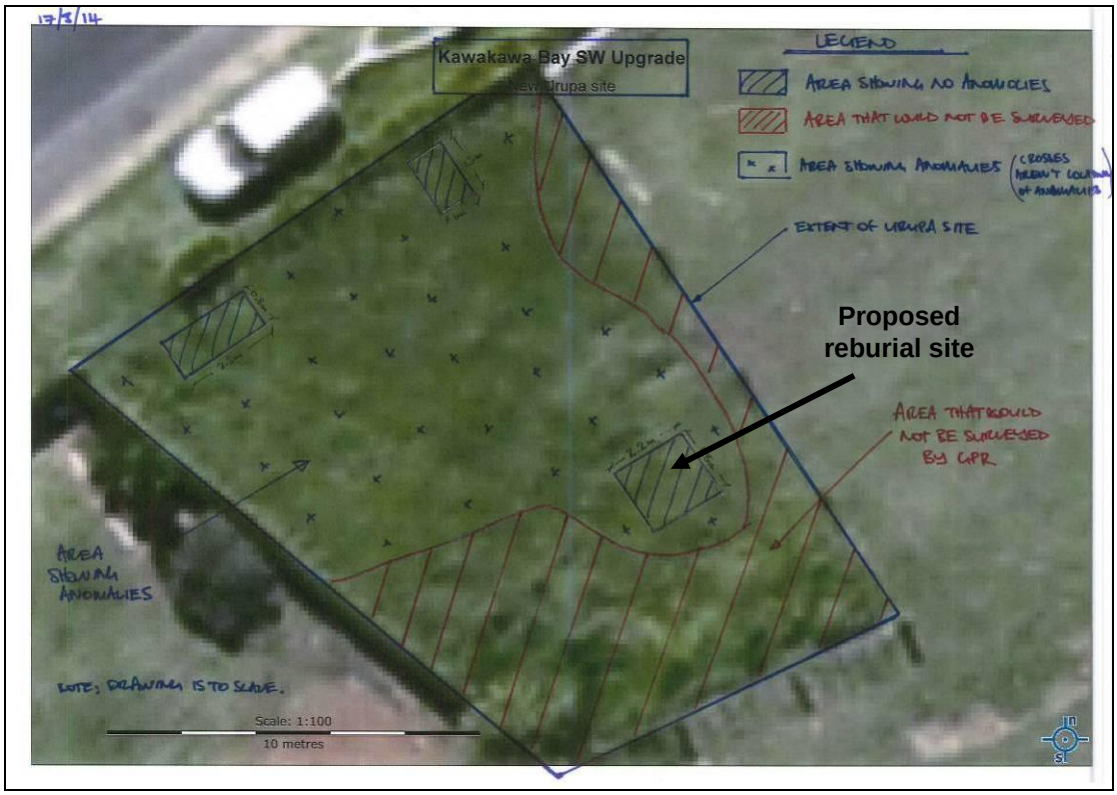

Figure 125. Results of GPR analysis in urupa and area used for reburial

Continued on next page

[10] CHI no 11780; Schedule 20D, Number 19, Manukau City Council District Plan, Operative, 2002. Map 79 http://www.aucklandcouncil.govt.nz/EN/planspoliciesprojects/plansstrategies/DistrictRegionalPlans/manukaucitydistrictplan/Pages/districtplanmapshome.aspx

RE-BURIAL, CONTINUED

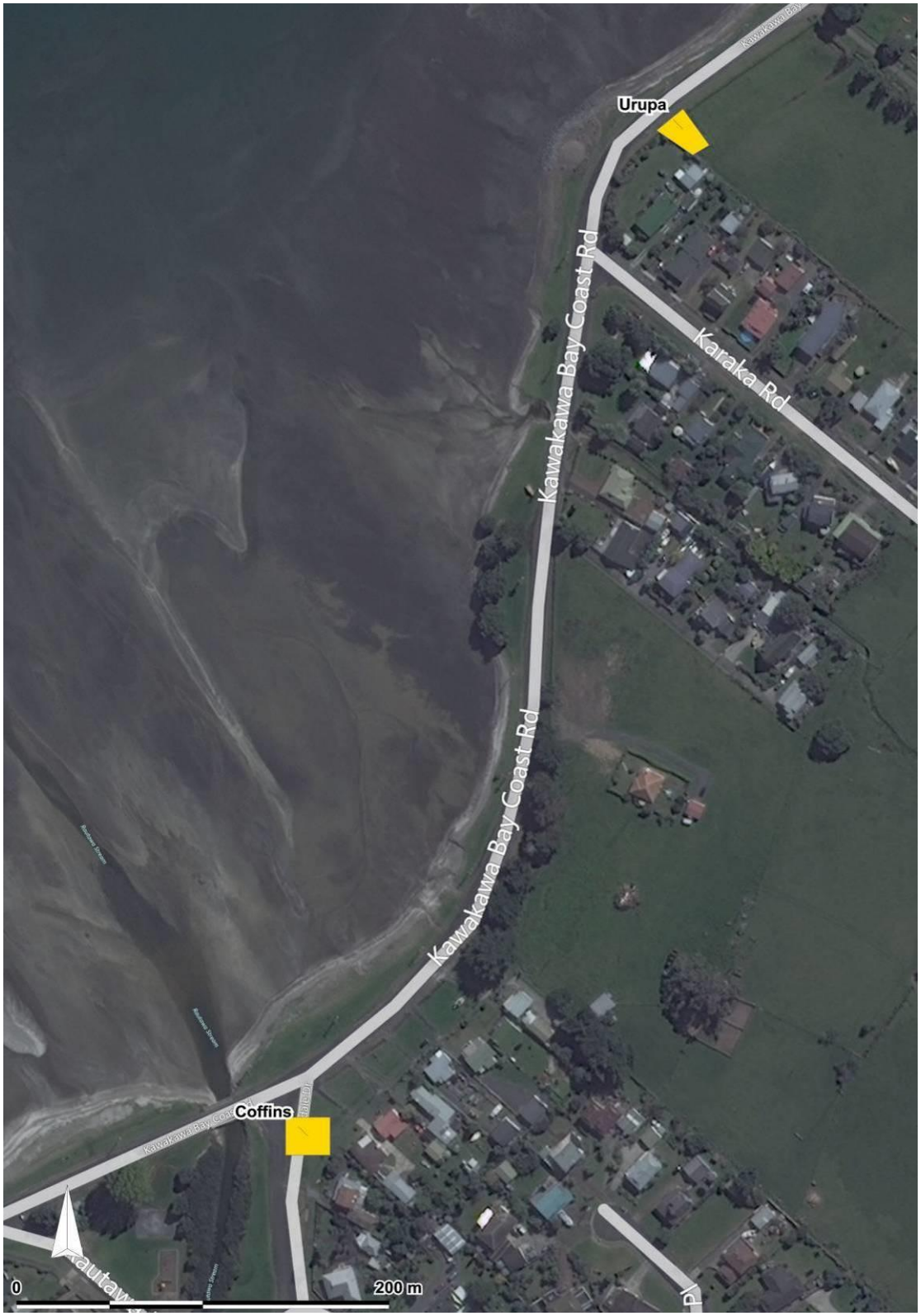

Figure 126. Location map showing area of coffins and urupa where koiwi were re-buried

Part 5: Summary and Conclusion

SUMMARY

Project Summary

The discovery of the burials under Ferndale Drive was unexpected as it is unusual for a road to be built over a historic period burial ground. The Watercare wastewater pipeline had earlier been cut parallel to the stormwater pipeline (Harlow et al. 2012) in Ferndale Drive, but no burials were identified then although it had passed within 2-3m of the edge of Burial 1.

Once burials were found, the GPR proved useful in defining the likely extent of the burial ground. The results were not definitive in terms of identifying the numbers of burials or any specific information regarding the coffins. This was perhaps not surprising giving the presence of bundle burials in the north-east corner, the large number of individuals in the main trench and the presence of burials under the large coffin (B1).

A possible urupa had been identified in the area by Harlow (NZAA site record form), although no clear historic information pointed to exactly where the site was. No records of the individuals that were buried there have yet been found, although it is still possible that future research will unravel the story. The urupa was assumed to be associated with the Taupo Village known to have been present in the area during the 19th century. Its location near the mouth of a freshwater stream leading into the sea is a pattern recorded elsewhere for 19th century burials in the region (see e.g., Bickler and Macready 2013:27).

The burial goods including the cache of coins make it clear that the B1/B7 burial was not earlier than 1842 and we can assume that it was some years later. The 1846 coin from B2 represents the latest of the datable artefacts, but given the time it took for these items to travel after minting and come to New Zealand, a date after at least 1850 for the coffin burials appears justifiable.

Traditional items such as shark teeth and greenstone pendants were found with the burials. These were clearly very personal items associated with the individuals and their families. The greenstone pendants were relatively plain and all roughly similar. Similar greenstone pendants have been associated with high status individuals such as chiefs.

Most of the coffins identified were the typical tapered hexagonal shape, similar to those found by Harlow et al. (2012) nearby. Two burials, B2 and B8, appeared to have the simpler rectangular coffins that were also identified during the 2006 excavations by Lawlor (reported by Littleton et al. 2006; Littleton et al. 2010).

The findings from both Harlow et al. (2012) and the current project suggest that although a number of urupa were gazetted during the 20th century in Kawakawa Bay, this did not capture all the possible urupa related to the 19th century occupation.

Continued on next page

Project Summary, *continued*

Harlow et al. (2012) have provided the most recent summary of the archaeology of the Kawakawa Bay area and this has been discussed in the background above. The stormwater pipeline project also provided an opportunity to investigate midden and other activities thought to be associated with Taupo Village, recorded on maps in the 19th century. As with the earlier wasterwater project (Harlow et al. 2012), the pipeline trenching was narrow and inhibited the exposure of features over a wider area, although topsoil scraping did allow for some areas to be exposed and recorded. This confirmed that scattered fire scoops with hangi stones and midden were dotted over the top of the natural shell and beach sand tidal wash.

The area is highly dynamic and it seems likely that it was vulnerable to both the tidal movement and storm surges. As a result, much of the low lying area of the Bay appears to be covered in a widespread "cultural layer" identified by Baquié and Harlow (Harlow et al. 2012). This layer contains patches of charcoal rich sandy soil mixed with hangi stone and other archaeological material. The bases of archaeological features have been found during the excavations but the cultural layer is distributed over a wider area. The tidal flow, mixed with the storm surge material and archaeological material, makes some of the stratigraphic interpretation in the area more complicated as clearly older natural layers can be mixed with the archaeological and modern farming material. Despite this, there is good evidence that other elements of the archaeological settlement in the Bay would be found during any future excavations, particularly associated with the location of the Kawakawa and Taupo villages identified on historic plans.

Urupa

The discovery of the urupa under Ferndale Drive was an emotional and unexpected find. The individuals, including men, women, children and infants, clearly represented all parts of the local population. There is no indication that these burials resulted from war or raiding, or a temporary encampment, or that those who buried them were hurriedly dealing with the mass deaths of an epidemic. Rather, time had been taken over coffin construction and most were laid in neatly parallel graves. The single burials showed that European burial traditions had been adopted: individuals were laid out extended on their back and buried in coffins constructed of planks nailed together, one of which may also have been lined with fabric. Glass buttons recovered showed that some people at least were also buried in European clothing.

Continued on next page

Urupa, *continued*

There were aspects of the burials that evoked more traditional pre-contact Maori burial practice: secondary burial was still present, and in one case (Burial 7) was associated with a coffin burial (Burial 1). Some individuals were buried with items of distinctly traditional Maori material culture. It appears that this was a time when the living community drew on both new and old practices for dealing with death. The combination of traditional and historic coffin burial styles is an intriguing aspect of the site, showing a community in transition.

Health, Diet and Disease

The osteological analysis of the koiwi suggested that other European practices had been adopted during life. The adults showed signs of smoking tobacco pipes. There was evidence that the diet had lost the abrasive quality that had previously had a highly erosive impact on the teeth of pre-contact Maori. The softer diet of these people had a very different effect on their teeth.

Other aspects of health showed continuity with pre-contact era Maori: arthritis in the neck and well developed muscle attachments indicated that they were very physically active people, particularly in the upper body. Squatting facets on the tibiae also suggest similarity of activity and living to pre-contact times. The health of these people had been such that they grew to be tall and in some cases extremely robust individuals. However, living conditions and the disease environment meant that many infants and children did not make it to adulthood and at least five members of the group suffered chronic disease for a period of time before death.

Causes of Death

Although it may be that these people died of one of the many epidemics that affected early colonial New Zealand, there is no particular physical evidence in the cemetery to indicate that this group of burials resulted specifically from an epidemic. There was no evidence of crowding, mass graves, multiple coffins placed in one grave cut or of particular economy being required for the size of the grave cuts. Time was taken to place people (those with a primary burial) in individual coffins, which were likely to have been tailor-made and which involved craftsmanship. Only the high number of subadults could be taken to indicate that one of the most vulnerable sectors of society was being adversely affected by an epidemic. Due to the fact that it takes time for the skeleton to respond to illness, an epidemic that sweeps through an otherwise unafflicted population is liable to leave a number of dead whose skeletons will not have had a chance to respond and which show no sign of chronic illness. While it is still possible that these people at Kawakawa Bay died after finally succumbing to epidemics, it is clear that a number of them were dealing with more long-standing illnesses during their lives and were not solely victims of epidemic.

CONCLUSION

Conclusion

The excavations for the stormwater upgrade project provided archaeological evidence relating to Maori settlement in Kawakawa Bay. The results relate to:

1) 18th to 19th century settlement on the flat area behind the main Kawakawa Bay Coast Road;
2) Mid-late 19th century burials below Ferndale Drive along the Rautawa Stream.

The exposure of shell midden and mixed cooking areas suggests the obvious processing of kai moana along the beach front, probably over a large number of years to feed the occupants of the Taupo Village. No specific evidence of the living areas has been identified, but it seems likely that these were present further back from the coastline on the marginally higher ground, more suitable for whare. The cooking area would have been vulnerable to tidal surges but otherwise would have been ideal. River cobbles were brought in from the nearby rivers and streams to use as hangi stones. Gardens were probably located around the village up the north facing slopes of the nearby hills. Bracken and fern probably covered parts of the coastal zone, providing food, with access to the bush and larger timber including kauri in the hinterland.

It is strange that no specific evidence relating to the 19th century individuals buried at the urupa under Ferndale Drive had been recorded. At least 31 individuals were buried at the location and, along with European-style coffin burials, there were clear indications of a number of secondary burials contemporary with the coffins. No obvious reason was discovered as to why the individuals in Burial 7 were buried under Burial 1, for instance. The location of the basket burials (B8) associated with young children and infants suggest that these were reburied to be close to other family members when the urupa was built.

The coffins and burial goods show an intriguing combination of traditional Maori practices influenced by the arrival of European material cultural and religion. Along with greenstone and shark tooth pendants, an important find was the tin box filled with coins. The coins obviously suggest significant wealth, but the individual they belonged to was not in a coffin. The variety of coins is also remarkable. Exotic explanations such as an overseas trip or trips appear less likely as all the coins were probably legal tender in New Zealand at the time of burial. Whether the coins were collected by the person they were buried with, or collected by family and friends for the burial, is not known but it is certainly a valuable cache.

The archaeological finds so far uncovered in Kawakawa Bay have started to shed some additional light onto the 17th to 19th century Maori occupation of the Bay, with earlier evidence found in the inland areas. However, the rich historical evidence summarised at the beginning of the report suggests that what has been found to date is a just fragment of the surviving cultural heritage, and future finds in Kawakawa Bay are likely.

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Flowerday Enterprises
Bruce Flowerday, Mike Crate, Steve, Gab, Rau

Kawakawa Bay Residents
Brian and Lionel/Turei Road, Reta Whitford, Bob and Hazel Spick, Rev Linda King ,Christine Castle
Margaret and Kevin Moeke

Aquaturf Ltd
Brynn

APPENDIX 1 – UPDATED SITE RECORD FORM

NEW ZEALAND ARCHAEOLOGICAL ASSOCIATION

ARCHSITE archaeological site recording scheme

Site Record Form

NZAA SITE NUMBER: S11/1083

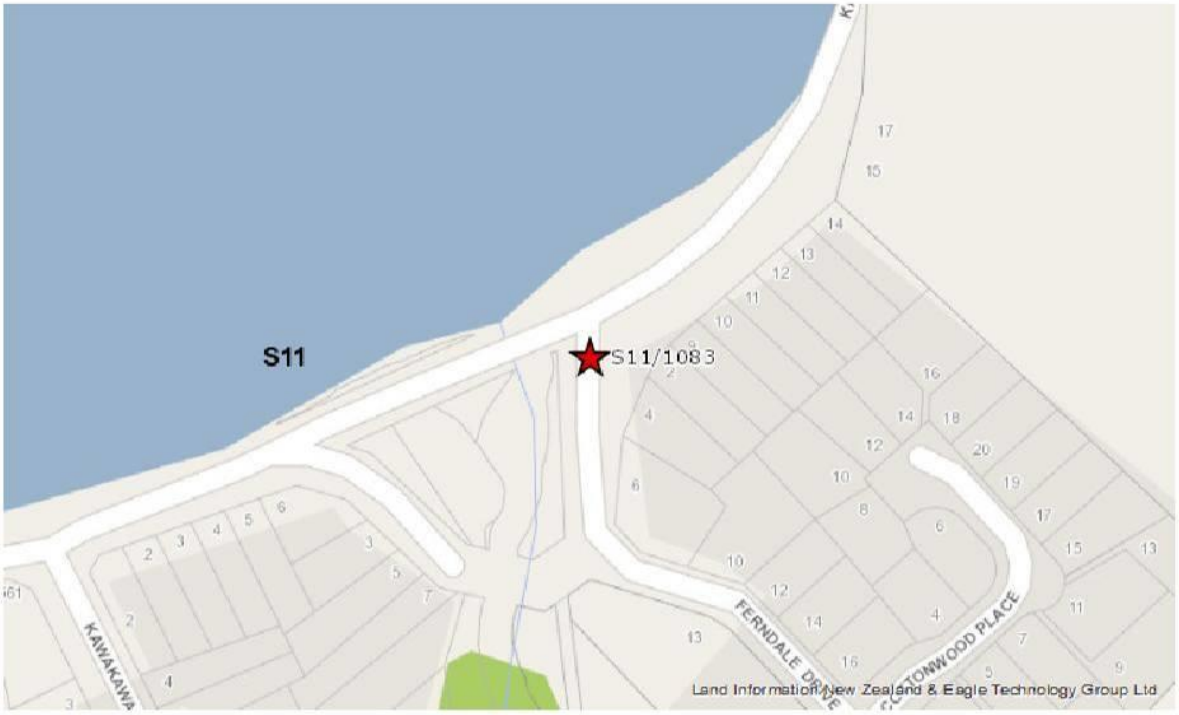
SITE TYPE: Midden/Oven

SITE NAME(s):

DATE RECORDED: 30/08/2010

SITE COORDINATES (NZTM) Easting: 1793359 **Northing:** 5908755 **Source:** Handheld GPS

IMPERIAL SITE NUMBER: **METRIC SITE NUMBER:**



Finding aids to the location of the site

Ferndale Road.

Brief description

Midden in trench.
28 Burials uncovered under Ferndale Rd during excavations. Including coffin burials as well as other material,

Recorded features

Artefact - obsidian, Burial, Midden, Ovenstones

Other sites associated with this site

Continued on next page

APPENDIX 1 – UPDATED SITE RECORD FORM, CONTINUED

NEW ZEALAND ARCHAEOLOGICAL ASSOCIATION

SITE RECORD HISTORY	**NZAA SITE NUMBER:** S11/1083

Site description

Updated: 30/08/2010, Visited: 08/04/2010 - NZTM E1793359 / N5908755 (Handheld GPS). Trench across Ferndale Road; midden, obsidian, charcoal, hangi stones. Inspected by: Baquie, Barry.

Updated: 13/07/2012 - See Harlow, D., B. Baquie and S. H. Bickler. 2012 Kawakawa Bay Wastewater Scheme Project Final Archaeological Report NZHPT Authority No. 2006-162. Updated by: Bickler, Simon.
Updated: 09/07/2014, Visited: 01/05/2014 - 28 Burials uncovered under Ferndale Rd during excavations. Including coffin burials as well as other material. Burials undercovered in 2014 during stormwater upgrade work for Auckland Council under Authority from NZHPT No 2014/478. Details in various reports. Midden exposed further east including hangi stones, firescoops and a fernroot beater found in the trench.

Condition of the site

Updated: 09/07/2014, Visited: 01/05/2014 - Known burials removed for reburial in nearby urupa.

Statement of condition

Updated: 03/11/2010, Visited: 08/04/2010 - Fair - Some intact features, but others may be unclear or damaged

Current land use:

Updated: 09/07/2014, Visited: 01/05/2014 - Rural residential, Coastal margins, Road reserve

Threats:

Updated: 09/07/2014, Visited: 01/05/2014 - Residential activities, Road/ track formation or maintenance, Services/ utilities

Continued on next page

APPENDIX 1 – UPDATED SITE RECORD FORM, CONTINUED

NEW ZEALAND ARCHAEOLOGICAL ASSOCIATION

SITE RECORD INVENTORY | **NZAA SITE NUMBER:** S11/1083

Observations about this site made in

Author | **Year** | **Title** | **Publication Details**

Supporting documentation held in ArchSite

Stormwater trench across Ferndale Drive (looking west) at area of burials (Simon Bickler)

NEW ZEALAND ARCHAEOLOGICAL ASSOCIATION

Hangi stones in fire scoop and midden along stormwater trench alignment (Barry Baquie)

APPENDIX 2 – RADIOCARBON DATES

THE UNIVERSITY OF WAIKATO
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Friday, 14 November 2014

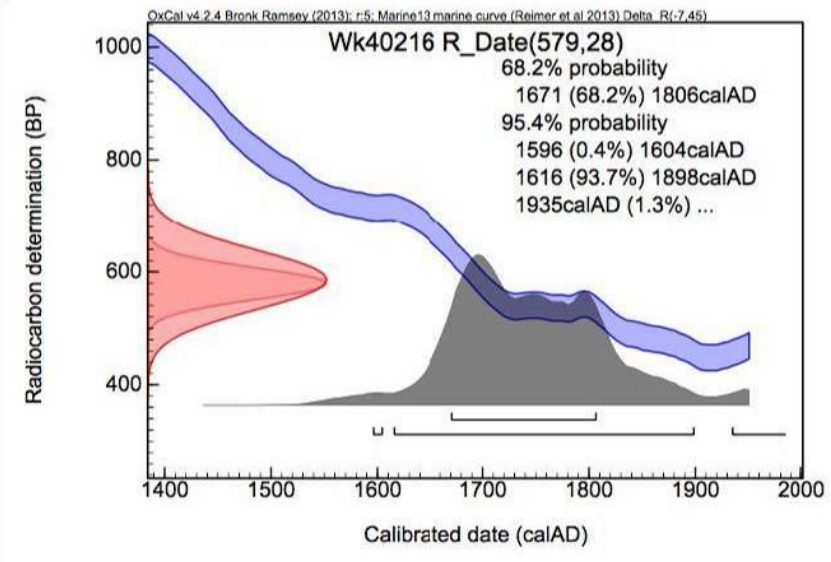
Radiocarbon Dating Laboratory

Report on Radiocarbon Age Determination for Wk- 40216

Submitter	S Bickler
Submitter's Code	S11/1083 SS2 cockle
Site & Location	S11/1083, 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.

$\delta^{13}C$	-0.1 ± 0.2 ‰
$D^{14}C$	-69.5 ± 3.3 ‰
$F^{14}C\%$	93.1 ± 0.3 %
Result	**579 ± 28 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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APPENDIX 2 – RADIOCARBON DATES, CONTINUED

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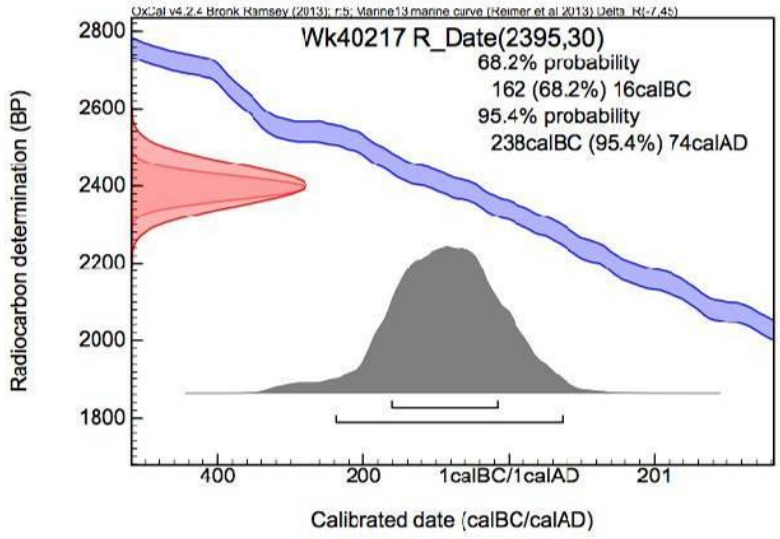
Radiocarbon Dating Laboratory

Report on Radiocarbon Age Determination for Wk- 40217

Submitter	S Bickler
Submitter's Code	S11/1083 SS5 cockle
Site & Location	S11/1083, 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.

$\delta^{13}C$	0.2 ±	0.2 ‰
$D^{14}C$	-257.8 ±	2.8 ‰
$F^{14}C\%$	74.2 ±	0.3 %
Result	**2395 ± 30 BP**	

Comments



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- 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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Friday, 14 November 2014

Radiocarbon Dating Laboratory

Report on Radiocarbon Age Determination for Wk- 40224

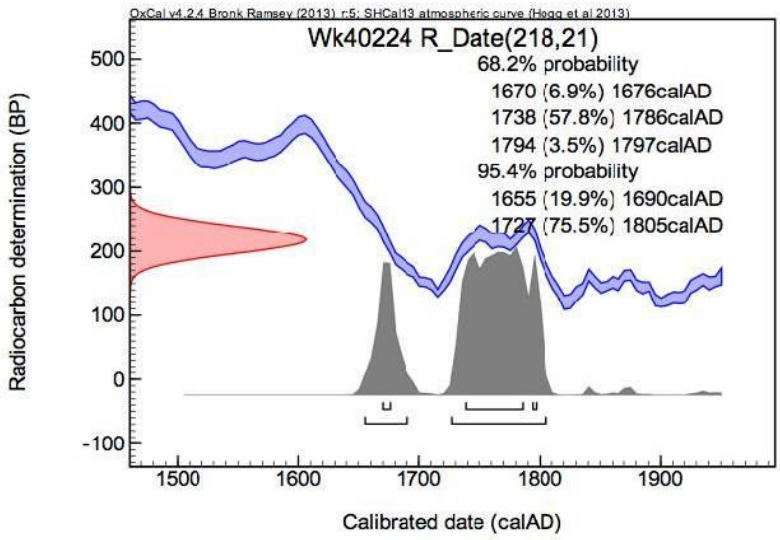
Submitter	S Bickler
Submitter's Code	S11/1083 SS2 charcoal
Site & Location	S11/1083, New Zealand
Sample Material	identified charcoal
Physical Pretreatment	Sample cleaned.
Chemical Pretreatment	Sample washed in hot HCl, rinsed and treated with multiple hot NaOH washes. The NaOH insoluble fraction was treated with hot HCl, filtered, rinsed and dried.

$D^{14}C$	-26.8 ± 2.5 ‰
$F^{14}C\%$	97.3 ± 0.2 %
Result	**218 ± 21 BP**

(AMS measurement)

Comments

Please note: Because of the small size of this sample, 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.



- 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)*.

AG Hogg

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Friday, 14 November 2014

Radiocarbon Dating Laboratory

Report on Radiocarbon Age Determination for Wk- 40225

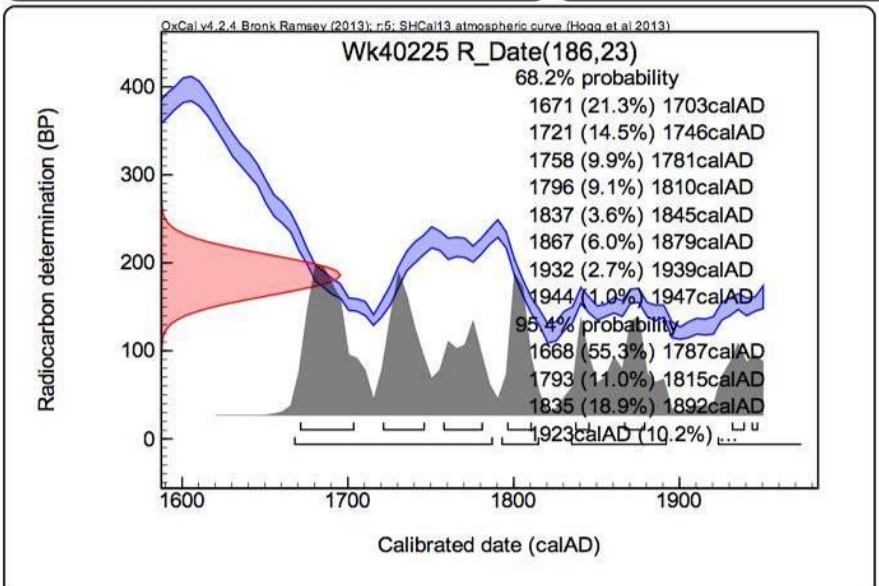
Submitter	S Bickler
Submitter's Code	S11/1083 SS5 charcoal
Site & Location	S11/1083, New Zealand
Sample Material	identified charcoal
Physical Pretreatment	Sample cleaned.
Chemical Pretreatment	Sample washed in hot HCl, rinsed and treated with multiple hot NaOH washes. The NaOH insoluble fraction was treated with hot HCl, filtered, rinsed and dried.

$D^{14}C$	-22.9 ±	2.7 ‰
$F^{14}C$%	97.7 ±	0.3 %
Result	**186 ± 23 BP**	

(AMS measurement)

Comments

Please note: Because of the small size of this sample, 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.



- 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)*.

APPENDIX 3 – WOOD AND CHARCOAL IDENTIFICATION

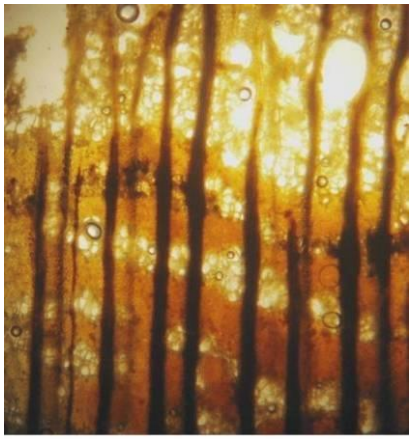
Kawakawa Bay, Auckland
Report to Clough & Associates Ltd

Rod Wallace
14th August 2014
Seven wood samples from three coffins and charcoal from nine soil samples were submitted for identification by Clough & Associates Ltd.

Wood from Coffins

Two of the coffins (#5 and #9) were made from Kauri while the other (#2) was made from an exotic hardwood that was probably a species of Oak.

Kawakawa Bay – Burial 9 – Coffin side – S.75	Kauri
Kawakawa Bay – Burial 9 – Coffin base - S.75	Kauri
Kawakawa Bay – Burial 9 – Coffin lid - S.69	Kauri
Kawakawa Bay – Burial 5 – Coffin base - S.79	Kauri
Kawakawa Bay – Burial 5 – Coffin wood general - S.76	Kauri
Kawakawa Bay – Burial 5 – Coffin back end - S.78	Kauri
Kawakawa Bay – Burial 2 – Coffin wood general - S.58	Exotic Hardwood – prob. Oak sp.


Kawakawa Bay Coffin #2 S.58 Cross section


Kawakawa Bay Coffin #2 S.58 TL Section

Charcoal from Soil Samples

Nine charcoal samples labelled "soil samples – C14" were submitted. The results are listed below and summarised in a Table. They indicate that the charcoal originated from regenerating secondary woody vegetation including bracken and small shrubs but dominated by Manuka and Kanuka accompanied by a few larger broadleaf tree species. There were no conifers present. Sub-samples suitable for C14 dating were separated out from most of the bags.

Summary Soil sample Charcoal Identifications			
Species	**Plant Type**	**# Pieces**	**%**
Fernroot	Fern	3	3%
Tutu	Small shrubs	1	25.5%
Hebe		2	
Fivefinger		7	
Pittosporum		3	
Akeake		12	
Mapou	Larger shrubs/ small trees	7	53%
Mahoe		9	
Manuka		26	
Kanuka		10	
Kohekohe	Broadleaf trees	4	18%
Tarairi/Mangaeo		5	
Pohutukawa		4	
Puriri		5	
Totals		**98**	

Kawakawa Bay – Soil Sample #3 (2/2)
Manuka 5
Mapou 2
Mahoe 1
Comments – suitable as a C14 dating sample

Kawakawa Bay – Soil Sample #3 (1/2)
Hebe 1
Pittosporum 2
Manuka 9
Comments – suitable as a C14 dating sample

Kawakawa Bay – Soil Sample #4
Tutu 1
Hebe 1
Manuka 3
Kanuka 4
Mapou 1
Kohekohe twig 3
Pohutukawa 2
Comments – The Tutu, Hebe, Manuka, Kanuka, Mapou and Kohekohe twig were separated out as suitable as a C14 dating sample.

Kawakawa Bay – Soil Sample #1
Kanuka 2

Mapou	1
Tarairi/Mangaeo	2
Pohutukawa	2
Puriri	5

Comments – No suitable C14 dating sample recovered.

Kawakawa Bay – Soil Sample #6

Akeake	10
Manuka	5
Mapou	1

Comments – suitable as a C14 dating sample

Kawakawa Bay – Soil Sample #7 (2/2)

Fernroot	3
Fivefinger	7
Akeake	1
Pittosporum	1
Manuka	2
Mapou	1
Kohekohe	1

Comments – All except the Kohekohe was separated out as suitable as a C14 dating sample.

Kawakawa Bay – Soil Sample #7 (1/2)

Manuka	2

Comments – All charcoal suitable as a C14 dating sample.

Kawakawa Bay – Soil Sample #2

Akeake	1
Kanuka	3
Mahoe	1
Tarairi/Mangaeo	3

Comments – The Akeake, Kanuka and Mahoe were separated out as suitable as a C14 dating sample.

Kawakawa Bay – Soil Sample #5

Mapou	1
Mahoe	7
Kanuka	1

Comments – The Mapou, Mahoe and Kanuka were separated out as suitable as a C14 dating sample.