Appendix Two: Stratigraphic details of Ponamla, Ifo, Mangaasi and Arapus test pits

The datums for the test pits were generally established adjacent to the excavated areas and depths were consistently measured from those points. The relative position of the datum points to the surrounding topography were calculated either in relation to their height above sea level (asl) which in all cases apart from Mangaasi was above the mean high tide mark. In the case of Mangaasi, datum points were calculated above a live coral datum representing mean sea level. The layer depths for the various test pits are given as centimetres below datum (cm bd).

Ponamla test pits

A total of nine test pits were excavated across the site. Initially five test pits (TPs 5.1–5.5) were excavated along a north-south transect A–A’, followed by another four test pits in various locations (TPs 6–9) (Fig. 3.1). The test pits were spread across the site and therefore often demonstrated quite distinctive stratigraphies. Although several corresponding layers can be identified between the various test pits, the stratigraphy is labelled separately and discussed as per each test pit (Fig. 3.3).

**TP 5.1** (13.59m asl), the most southern test pit was located on the flat area of the river terrace, some 15m from the edge of the riverbank. The stratigraphy was largely sterile and comprised four layers.

Layer 1 (10–50cm bd): Small limestone boulders were removed from the surface. Beneath the boulders, the matrix consisted of a black topsoil (10 YR 2/1) with very occasional limestone cobbles. Flecks of charcoal were noted and very degraded shellfish and pottery (1 sherd) were recovered. Layer 1 graded into Layer 2.

Layer 2 (50–60cm bd): A very dark grayish brown (10YR 2/1) sediment dominated the Layer 2 matrix with frequent lumps of yellow/brown clay also noted. Increasing charcoal with depth and again worn pottery (1 sherd) was recovered. There was a sharp break between this layer and Layer 3.

Layer 3 (60–95cm bd): This layer consisted of a very hard-packed concentrated cobbles and very dark brown (10YR 2/2) sandy silt. Flecks of charcoal were recovered along with worn sherds (6). This layer marked the interface of the sterile and initial human settlement.

Layer 4 (95–130cm bd): Very compacted, sterile dark yellowish brown (10YR 3/6) river silt plus concentrated basalt pebbles characterised this layer. This is the remnant former alluvial terrace which has been formed due to the downcutting of the Ponamla river. This layer was identified across the whole site at the base of all the test pits.

TP 5.1 appears to be outside the area of the early settlement site. A total of 10 worn sherds were found through Layers 1 to 3 and were clearly in secondary deposition. Layers 1 and 2 comprise of later humic accumulation, post-dating the initial human settlement. Some slopewash would also have contributed to the buildup.

**TP 5.2** (11.68m asl) was located 20m north of TP 5.1, again on the flatter area of the river terrace but adjacent to one of the mound features that were concentrated on the east side of the terrace. The stratigraphy closely resembled that of TP 5.1.

Layer 1 (10–60cm bd): This layer comprised a black sediment (topsoil) (10YR 2/1) with few cobbles or pebbles. No artefactual material was recovered. It graded into Layer 2.

Layer 2 (60–110cm bd): This layer was a very compacted black (10YR 2/1) sediment mixed with frequent small river cobbles with increasing sand content with depth. Worn pottery (17 sherds) and charcoal were recovered. An abrupt delineation was noted between this layer and that below.
Layer 3 (110–150cm bd): This was a sterile layer consisting of river cobbles, boulders and dark yellowish brown (10YR 3/6) silty sand. The remnant former alluvial terrace signalled the base of the test pit.

There was little evidence uncovered in this test pit which indicated in situ remains of the early settlement. Layers 1 and 2 are later accumulations from both slopewash and humic buildup and Layer 3 the sterile former river terrace.

TP 5.3 (11.85m asl) was located a further 20m north of TP 5.2 on the top of the tapering end of a mound feature. Four layers were identified.

Layer 1 (10–30cm bd): This layer comprised a black (10YR 2/1) topsoil plus a moderate concentration of river cobbles and silt content. Layer 1 graded into Layer 2 with a noticeable increase in the concentration of cobbles. Sparse worn midden was recorded which included 8 sherds.

Layer 2 (30–70cm bd): A black (10YR 2/1) sediment amongst very concentrated small to medium basalt cobbles and occasional limestone boulders characterised this layer. Worn pottery (25 sherds) and shell were recovered with increasing frequency with depth. A sharp delineation was clear between this layer and Layer 3.

Layer 3 (70–90cm bd): This very hard-packed layer consisted largely of river sand and silt with a lesser percentage of black (10YR 2/1) sediment and only occasional river cobbles. At 90cm the layer became increasingly sterile and sandy marking the appearance of the former alluvial terrace. Four sherds were retrieved.

Layer 4 (90–120cm bd): The basal sterile dark grayish brown (10YR 3/6) sandy silt appeared at this depth along with frequent limestone cobbles and occasional boulders. Four sherds, clearly originating from a higher level, were recovered.

This test pit appears to mark the western periphery of the occupation activity area, with very sparse midden being recovered throughout. Pottery (48 sherds) bone and charcoal were recorded. Much of the material from Layers 1 and 2 appeared to be in secondary context. The midden content appearing at a depth of between 50–90cm, although far from concentrated, indicated the edge of the in situ remains of the early settlement sitting on top of the sterile basal river silt and cobbles.

TP 5.4 (9.63m asl) was located north and slightly down-slope of the areal excavation, Area A. Midden material was recovered throughout the four identified layers, although much of the recovered pottery appears to have been washed down-slope from the in situ deposit to the south, although at a depth of between 120–150cm bd remnant in situ deposits were identified.

Layer 1 (10–70cm bd): The matrix of Layer 1 comprised frequent basalt cobbles amongst a black topsoil (10YR 2/1). Frequent pottery (388 sherds) was recovered along with a number of historic artefacts (nail and glass) which confirmed the mixed nature of this upper layer. Further evidence of the churned nature of the layer was the retrieval of the only other dentate stamped sherd from the entire excavation. A sharp boundary could be identified between this and the layer below.

Layer 2 (70–130cm bd): Increased silt and sand with much less midden and little very dark grayish brown (10YR 2/1) soil content characterised Layer 2. Small to medium cobbles were also present but again in much lesser quantities than Layer 1. A greater concentration of cobbles along with ash and charcoal was noted at a depth of 120cm bd which indicated the level from which the in situ remains could be identified. Pottery (123 sherds), shell, charcoal and bone were noted from this level.

Layer 3 (130–160cm bd): Layer 3 consisted largely of a black (10YR 2/1) silty sediment, some ash and midden. This layer represents the initial human occupation on top of former foreshore.
Large limestone boulders also began to appear. A clear boundary could be identified between the layers. Seventeen sherds were recovered.

Layer 4 (160–200cm bd): Loosely compacted sterile very dark brown (10YR 2/2) silt and gravel with small to large cobbles and boulders signalled the surface of the former alluvial terrace. This test pit was located close to the northern limit of the site. In situ remains were recorded only at a depth of 120–160cm bd. The stratigraphy above this level contained midden material in secondary deposition. A total of 528 sherds were recovered from TP 5.4, by far the largest number of any of the test pits. This reflects both the proximity of the test pit to the midden rich mound to the south and the consequent large number of sherds accumulated through secondary deposition and the actual in situ deposit at the lower level. A dispersed charcoal sample which returned a date of 2050±70 BP (ANU-10295) 2298–1833 BP* for Layer 3 would seem not to relate to the in situ cultural material. The submitted charcoal may well have been contaminated with later material (slopewash) that had mixed with the earlier deposit.

TP 5.5 (7.7m asl) was located a further 20m north of TP 5.4 and was almost 2m lower. Three layers were identified.

Layer 1 (15–25cm bd): This layer consisted of black (10YR 2/1) silty sediment. Infrequent worn shell and one sherd were recovered along with a glass marble. This layer appears to represent the more recent thin humic accumulation on top of the former foreshore with midden materials associated with recent occupation.

Layer 2 (25–35cm bd): Increased pebble and cobble content amongst a black (10YR 2/1) sandy sediment characterised this layer. Infrequent midden consisted of worn sherds (2) shell and bone.

Layer 3 (35–80cm bd): This basal layer consisted of larger river cobbles and boulders with loose very dark gray (10YR 3/1) silt and gravel representing the sterile former foreshore. The proximity of this test pit to the beach would have precluded it from being suitable for habitation 3000 years ago. This was certainly reflected in the stratigraphy. There is also the possibility that evidence of the earlier settlement may have been destroyed by cyclonic activity.

TP 6.0 (15.06m asl) was located on the top of the southern most mound feature. The ground surface at TP 6.0, was by several metres, the highest of all the excavated test pits. It was closer to the adjacent slope and was therefore subject to increased rates of slopewash. The sterile former foreshore was reached at a depth of 3 metres below datum. A total of 8 layers were identified.

Layer 1 (10–50cm bd): This layer consisted of very concentrated small to medium sized limestone pebbles amongst a black (10YR 2/1) (topsoil) soil matrix and appears to have been formed through recent slopewash. Two worn sherds only were recovered.

Layer 2 (50–85cm bd): This layer was similar to Layer 1 but the concentrated limestone pebbles become small to medium cobbles and boulders within a black (10YR 2/1) soil matrix. Again relatively sterile midden-wise with only two sherds being recovered.

Layer 3 (85–140cm bd): The frequent limestone cobbles and boulders abruptly disappeared which delineated this layer from Layer 2. A black (10YR 2/1) sediment matrix made up the bulk of this layer which was interspersed with frequent limestone pebbles. Seven sherds recovered.

Layer 4 (140–160cm bd): At this depth the limestone pebbles largely disappeared and were replaced by a sand component within a very dark brown (10YR 2/2) sediment. Increased midden (pottery (9 sherds), shell, charcoal and bone) appear from this level but the worn nature of the ceramics suggests that they were still largely in secondary deposition.

Layer 5 (160–195cm bd): Increasingly black (10YR 2/1) sediment with patches of ash and frequent small to medium pebbles and cobbles characterised this layer. The midden content (pottery (29 sherds), shell, bone and charcoal) also increased and appeared to be in situ. The layer
was primarily made up of rake-out from cooking fires and ovens and was very similar in nature to the stratigraphy of the lower layers of Area A. A concentration of shell was recorded at the bottom level of the layer.

Layer 6 (195–240cm bd): This layer was largely a continuation of the layer above but with an increased content of cobbles. Midden was again frequent and in situ. A further increase in the quantity of sherds (127) can be noted.

Layer 7 (240–260cm bd): Layer 7 consisted largely of a hardpacked dark grayish-brown (10YR 4/2) silty sediment. Few cobbles were in evidence. Midden included shell, bone and charcoal. A dispersed charcoal sample from this layer returned a radiocarbon date of 2680±70 BP (ANU-10296) 2945–2715 BP which corresponds to the earliest layers in Area A and confirmed this as the layer representing initial human habitation.

Layer 8 (260–300cm bd): This basal layer consisted of a dark yellowish brown (10YR 4/4) silt and gravel with frequent medium sized cobbles and large limestone boulders, indicating the level of the sterile former foreshore and/or alluvial terrace.

The excavation of TP 6.0 dramatically demonstrated the slopewash concentrated on the east of the site with the in situ midden material being identified at a depth of 160cm. Also that the area of the initial habitation continues for some distance further east. The increasing depth of the overburden however prevented any testing further into the slope. The ceramics were consistent with those from Area A as was the date recovered from Layer 7.

TP 7.0 (12.89m asl) was located just below TP 6.0 in a trough between two mound features to establish the nature of the stratigraphy at that point. Four distinct layers were identified.

Layer 1 (5–30cm bd): This layer consisted of a hard-packed black (10YR 2/1) sediment (topsoil) with frequent basalt cobbles and sparse midden content. It graded into Layer 2.

Layer 2 (30–100cm bd): This was again a very hard-packed matrix, made up of black (10YR 2/1) sediment with increasing silt content. Frequent small to medium cobbles were also noted. Increased midden content (pottery (76 sherds), charcoal, shell and bone) was recorded in the lower 20cm of this layer. This material appeared to be in situ midden although in much less dense concentration than found within the mound features. A clear boundary could be seen between this and the layer below.

Layer 3 (100–160cm bd): This layer consisted of very dark gray (10YR 3/1) silt and gravel with large limestone boulders. Sparse midden material including 53 sherds were also recovered. This layer marked the interface of the sterile and initial human habitation layers.

Layer 4 (160–170cm bd): This sterile basal layer was made up of a dark brown (7.5YR 3/2) river sand and silt with frequent pebbles and cobbles.

This test pit, although positioned in the same area as the mound features, highlights the variability found between the mounds and flatter areas. The mounds appear to represent areas where stone terraces were built which were foci for cooking activities and the consequent dumping of midden. In other areas the midden appears to be generally in secondary deposition, the pottery was often well worn and has been moved around over long periods of time through various post-depositional processes.

TP 8.0 (10.91m asl) was located on the western area of the terrace to test a small circular mound feature. Four layers were identified.

Layer 1 (5–40cm bd): This layer comprised a black (10YR 2/1) humic soil (topsoil) with limited silt content and frequent river cobbles. Infrequent worn midden was also recovered (9 sherds).

Layer 2 (40–70cm bd): Layer 2 consisted of a black (10YR 2/1) silty sediment with a medium concentration of basalt cobbles. Well worn and weathered midden was recovered from this layer (20 sherds).
Layer 3 (70–105cm bd): Very dark brown (10YR 2/2) river silt with little soil content and few cobbles and even sparser midden (13 sherds) characterised this transitional layer situated on top of the more sterile layer below.

Layer 4 (105–150cm bd): This basal layer represented the sterile former alluvial terrace and comprised a very dark grayish brown (10YR 3/2) sterile silt and gravel. Large limestone boulders were also noted.

The stratigraphy of TP 8.0 indicated that this area of the terrace was peripheral to the early habitation site and the recovered midden material associated with the earlier occupation was in secondary deposition. There was no in situ evidence of the early settlement from this test pit. It would appear to be a later feature associated with the clearance of the adjacent areas of stone along with evidence of succeeding humic accumulation.

TP 9.0 (7.2m asl) was located in the north western area of the site amongst a series of historic house terraces. Three layers only were identified.

Layer 1 (10–50cm bd): This layer comprised a black (10YR 2/1) sandy river silt with minimal humic content. Frequent small to medium basalt cobbles were also noted. Worn shell, charcoal flecks and bone were recovered along with an unidentified metal object.

Layer 2 (50–90cm bd): Layer 2 was a layer of very dark brown (10YR 2/2) river silt and sand with no cultural remains present. It represented the interface of the sterile and the later human occupation. This layer graded into the sterile layer below.

Layer 3 (90–130 cm bd): The basal layer consisted of a very dark grayish brown (10YR 3/2) sandy silt with medium concentrations of pebbles and cobbles. This layer is the former riverbank that was only utilised late in the cultural sequence.

No pottery was recovered from TP 9.0. The sparse midden consisted only of weathered shellfish, charcoal and bone from Layer 1. This part of the alluvial terrace was likely to have been much closer to sea level at the time of initial settlement and less suitable for settlement.

Ifo test pits

The Ifo site is concentrated on a series of linear mound features. A number of the ridges run parallel to the river and appear to be former beach ridges while others run at right angles and are primarily made up of cultural material. These cultural (linear) mounds have been formed through the accumulated dumping of midden and other debris over a long period of time. A total of thirteen, 1 by 1m test pits were excavated across the Ifo site to determine the area of the site and any temporal/spatial variation (Fig. 3.4, 3.5). All but two (TP8 and 14) showed similar stratigraphic accumulation and the layers can be directly correlated. The recovered midden remains are outlined in detail in other relevant chapters.

TP 2 (8.94m asl) was located on the top of a north-south aligned mound feature that had been truncated during the construction of a logging road in 1988. This was the most inland, in relation to the Ifo River, of all the test pits. It marked the northern limit of the Lapita settlement, but was outside the area of later settlement associated with distinctive fingernail decorated ceramics.

Layer 1 (10–60cm bd): This layer comprised a black (10YR 2/1) humic topsoil with frequent basalt and coral cobbles. Its accumulation was due to a combination of intermittent clearance of the area interspersed with humic accumulation when the area was under forest. Recovered midden remains were sparse and comprised only occasional worn shellfish. It graded into the layer below.

Layer 2 (60–105cm bd): The matrix of this layer was very similar to that of the layer above apart from an increasing sand component. The black (10YR 2/1) sediment contained less frequent cobbles but increasing quantities of shellfish. No other midden remains were recovered.
Layer 3/4 (105–120cm bd): A distinctive boundary was reached at 105cm bd with the appearance of a dark yellowish brown (10YR 4/4) coral sand. It appeared to mark the interface of the degraded coral terrace and initial human settlement. Occasional coral boulders and flat blocks were also recorded. Midden remains included calcareous-tempered (11 sherds) pottery (generally associated with dentate-stamped Lapita ceramics at Ifo), shellfish and a scoria abrader.

Layer 5 (120cm bd): This hard packed yellowish brown (10YR 4/5) coral sand represented the sterile basal uplifted coral terrace.

**TP 3** (9.09m asl) was located on the central area of an east west aligned mound feature (Fig.3.5) to the east of the areal (Trench B,C and D) excavation to which the layers could be directly related. Frequent midden remains including pottery, shell, bone and a number of non-ceramic artefacts were recovered throughout the stratigraphy. A total of six layers were identified amongst the 180cm of stratigraphy.

Layer 1 (0–50cm bd): This layer consisted of a humic black (10YR 2/1) topsoil with concentrated water worn coral and basalt cobbles. It graded into the layer below with a lessening of cobble content with depth. Midden remains included 13 sherds, 6 of which were decorated with fingernail impression.

Layer 2 (50–70cm bd): This layer was similar to the layer above but as noted there was a dramatically decreased cobble content. The black (10YR 2/1) sediment was also increasingly silty. Eight sherds only were recovered.

Layer 3 (70–150cm bd): A distinct stratigraphic change at 70cm bd made Layer 3 easily identifiable. It consisted primarily of concentrated water worn basalt and coral cobbles within a very dark gray (10YR 3/1) sandy sediment. Flat coral blocks were recorded at the lower level of the layer. Frequent shellfish, bone and fingernail decorated pottery (17 sherds) were recovered from throughout this layer.

Layer 4 (150–170cm bd): Decreased cobble and soil content characterised Layer 4. It consisted largely of dark yellowish brown (10YR 4/4) coral sand. Recovered midden included occasional calcareous-tempered pottery (6 sherds), bone and charcoal. The layer was clearly associated with initial human settlement of the area. A radiocarbon determination on a marine shell returned a date of 3100±70 BP (ANU-10681) 3059–2735 BP which corresponds with dates from the earliest layers of Trench D.

Layer 4a (170–180cm bd): This layer which lay directly on top of the degraded coral terrace consisted of concentrated pumice pebbles. There were no midden remains contained within the layer. It would appear to be a natural water borne deposit related to regional volcanic activity prior to human settlement at the site.

Layer 5 (180cm bd): The basal coral terrace was encountered at a depth of 180cm bd at which point excavation was halted.

**TP 4** (8.52m asl) was located to the west of the areal excavation on the lower south facing slope of the same mound feature (Fig. 3.5). The stratigraphy was relatively shallow due to the test pit being positioned on the periphery of the mound. Several layers that had been identified in Trenches B–D were not present in TP 4 and midden remains were sparse.

Layer 1 (0–30cm bd): This layer comprised a black (10YR 2/1) humic topsoil with frequent coral and basalt cobbles. Three plain sherds were recovered. A sudden decrease in the concentration of cobbles signalled the appearance of Layer 2.

Layer 2 (30–60cm bd): This was similar to the above layer but the black (10YR) sediment was increasingly silty with a corresponding dramatic decrease in cobble content. At the interface of this layer and the sterile basal coral terrace a thin tapering remnant of the lowest cultural layers (3 and 4), seen in detail in the areal excavation, was recorded. A further two plain sherds were recovered from this layer.
Layer 5 (70 cm bd): This layer was the hard packed sterile basal layer characterised by yellowish brown (10YR 5/4) silt/sand from the degraded coral terrace.

**TP 5** (9.2 m asl) was located on the eastern slope of a north-south aligned mound feature in the south western area of the site. The test pit would appear to be located outside the area of settlement associated with ceramic use. Evidence of the Lapita phase was not present and the stratigraphy returned only sparse midden remains.

Layer 1 (10–50 cm bd): This layer consisted of the ubiquitous black humic topsoil (10YR 2/1) with concentrated coral cobbles. Sparse midden remains included worn pottery (11 sherds) and occasional shellfish.

Layer 2 (50–75 cm bd): A sudden drop in the concentration of cobbles characterised Layer 2. It was primarily a black (10YR 2/1) silty sediment but with an increasing coral sand content.

Layer 5 (75 cm bd): At this level the degraded basal coral terrace was recorded.

Layer 1 (10–50 cm bd): This layer consisted of black (10YR 2/1) humic topsoil with concentrated coral and basalt cobbles. Occasional large coral boulders were also encountered. Two plain sherds were retrieved from this layer.

Layer 2 (50–85 cm bd): A decrease in the frequency of cobbles and increasing coral sand content amongst a black (10YR 2/1) silty sediment characterised Layer 2. Eight sherds were recovered from this layer only two of which were decorated (fingernail impressed).

Layer 5 (85 cm bd): At 85 cm bd the hardpacked degraded coral terrace was encountered.

**TP 6** (8.35 m asl) was located to the east of the areal excavation on the western slope of a north-south aligned mound feature. The location of the test pit on the periphery of the mound limited the depth of the stratigraphy. Midden remains were sparse.

Layer 1 (10–50 cm bd): This layer consisted of black (10YR 2/1) humic topsoil with concentrated coral and basalt cobbles. Occasional large coral boulders were also encountered. Two plain sherds were retrieved from this layer.

Layer 2 (50–85 cm bd): A decrease in the frequency of cobbles and increasing coral sand content amongst a black (10YR 2/1) silty sediment characterised Layer 2. Eight sherds were recovered from this layer only two of which were decorated (fingernail impressed).

Layer 5 (85 cm bd): At 85 cm bd the hardpacked degraded coral terrace was encountered.

**TP 8** (8.24 m asl) was located in the eastern part of the site, closer to the Ifo River, on the tip of an east-west aligned mound feature. The stratigraphy proved to be largely sterile made up principally of remnant beach deposits and certainly outside the area of settlement that was associated with ceramics.

Layer 1 (0–20 cm bd): This layer consisted of the ubiquitous black (10YR 2/1) humic topsoil along with concentrated basalt and coral cobbles and represented more recent accumulation. No midden remains were recovered.

Layer 2 (20–90 cm bd): At 20 cm bd the soil content virtually disappeared to simply leave concentrated water worn coral and basalt cobbles, the remains of a remnant beach ridge.

Layer 3 (90–140 cm bd): The concentrated coral and basalt cobbles included an increasing content of coral sand from this depth. Excavation was terminated at 1.40 m bd due to the unstable nature of the test pit walls. Frequent small pumice pebbles were also recorded.

**TP 9** (8.32 m asl) was located to the west and downslope of the areal (Trench B–D) excavation. Its location on the periphery of the mound feature limited the depth of stratigraphy. Midden remains were sparse.

Layer 1 (0–30 cm bd): This layer consisted of a black (10YR 2/1) humic topsoil with a concentrated coral and basalt cobble component. Very worn pottery (7 sherds) and occasional shellfish were recovered.

Layer 2 (30–85 cm bd): Decreasing concentrations of cobbles and an increasing coral sand content characterised Layer 2. Pumice pebbles were also noted amongst the black (10YR 2/1) silty sediment. Sparse shell and worn pottery (11 sherds) comprised the recovered materials.

Layer 5 (85 cm bd): At 85 cm bd the sterile degraded coral terrace was encountered.
**TP 10** (8.25m asl) was located on the northern side of the logging road on the east side of a low north-south aligned mound feature. A recent house site was said to have been located in the vicinity. This was almost immediately confirmed with the recording of a coral pebble floor in the first few centimetres of excavation. Fragments of *navela* (shell money) were also recovered near the surface. This part of the site appeared to be largely outside the area of settlement associated with ceramic use.

Layer 1 (10–35cm bd): This layer was characterised by a black (10YR 2/1) humic topsoil with frequent coral and basalt cobbles. Pumice pebbles were also present. Sparse worn pottery (8 sherds) and shellfish were all that was recovered. It graded into the layer below.

Layer 2 (35–80cm bd): This layer was very similar to Layer 1 but with an increased sand content and disappearance of the concentrated cobbles. Pumice pebbles were still in evidence. At the lower level of this layer large coral blocks were recorded. These large coral blocks would appear to mark the initial clearance of the area for settlement, as is seen in the stratigraphy of the areal excavation. In the case of this test pit however the associated midden remains are lacking and there is nothing to suggest that this part of the site was associated with the initial Lapita settlement.

Layer 5 (80cm bd): At this depth the basal degraded coral terrace was encountered.

**TP 11** (7.84m asl) was located on top of a low mound south of the areal excavations (Trenches A–D). The stratigraphy was relatively shallow with sparse midden remains, indicating that it was largely outside the area of settlement associated with ceramic use.

Layer 1 (10–40cm bd): This layer consisted predominantly of concentrated coral and basalt cobbles within a black (10YR 2/1) humic topsoil. Sparse worn pottery (4 plain sherds) and occasional shellfish were recovered. This layer graded into the layer below with decreasing cobble content.

Layer 2 (40–70cm bd): This layer was characterised by a black (10YR 2/1) silty sediment with an increasing coral sand content. No midden was recovered.

Layer 5 (70cm bd): Excavation terminated at this depth once the sterile degraded coral terrace was revealed.

**TP 12** (9.14m asl) was located adjacent to and above TP 6, on top of the most eastern, north-south aligned mound feature (Fig. 3.5). The stratigraphy, which was up to 170cm deep, revealed five distinct layers which could be directly related to the stratigraphy identified in the areal excavations to the west. The mound feature where this test pit was located appeared to mark the eastern boundary of the site associated with ceramic use.

Layer 1 (5–55cm bd): This layer consisted of a black (10YR 2/1) humic topsoil with concentrated water worn coral cobbles and pebbles. Frequent worn pottery (50 sherds of which 10 were decorated with fingernail impression) and shellfish made up the recovered materials. The layer graded into the layer below.

Layer 2 (55–100cm bd): This layer was similar to the above layer but with a greatly decreased cobble content and an increasingly coral sand component set within a black (10YR 2/1) sediment. Frequent pumice pebbles were also encountered at this level. Midden materials were less frequent with pottery (28 sherds, 5 of which were decorated with fingernail impression) making up the bulk of the recovered materials.

Layer 3 (100–150cm bd): A sudden increase in the concentration of basalt cobbles and occasional coral blocks set within a very dark gray (10YR 3/1) sandy sediment characterised Layer 3. Recovered midden materials again included pottery (6 sherds) and increasing quantities of shellfish and charcoal. This layer was associated with the initial human settlement of the area and can be correlated with Layer 3 in Trenches B–D.
Layer 4 (150–170cm bd): Layer 4, made up of a dark yellowish brown (10YR 4/4) coral sand with sparse silt content, marked the interface of the sterile uplifted coral terrace and the lowest cultural layer.

Layer 5 (170cm bd): The degraded coral terrace was encountered at this level.

TP 13 (9.24m asl) was located on top of a large square mound feature to the west of the areal excavation. A total of six distinct layers were identified in the 170cm of stratigraphy which could be directly related to layers identified in the areal excavation.

Layer 1 (0–50cm bd): This layer comprised a black (10YR 2/1) humic topsoil with concentrated water worn coral and basalt cobbles. Frequent worn pottery (21 sherds, 2 decorated with fingernail impression) and shellfish were recovered. This layer graded into the layer below with decreasing cobble content.

Layer 2 (50–70cm bd): This was again a black (10YR 2/1) sediment but with much less frequent cobbles and an increasing sand content. Patches of ash and charcoal were also noted. Recovered midden included occasional worn pottery (5 sherds and shellfish.

Layer 2a (70–100cm bd): This 30cm thick layer consisted almost solely of concentrated water worn coral and basalt cobbles and was largely devoid of any silt content or midden remains except for occasional worn pottery (3 sherds). It would appear to represent an intensive clearance event. A similar event and stratigraphy were recorded in Layer 2 of Trench A.

Layer 3 (100–150cm bd): This layer consisted of an increased content of very dark gray (10YR 3/1) sandy sediment with concentrated basalt and coral cobbles. Midden remains including pottery (6 sherds) and shellfish were also recovered in association with charcoal and patches of ash. At the lower level of this layer frequent pumice pebbles were recorded.

Layer 4 (130–170cm bd): Layer 4 represented the interface of the earliest cultural layer and the sterile basal coral terrace. It consisted of dark yellowish brown (10YR 4/4) coral sand, gravel and occasional pebbles. Recovered midden although sparse included occasional calcareous-tempered sherds (3) along with shellfish and charcoal. This debris was associated with the initial human settlement of the area.

Layer 5 (170cm bd): Excavation ceased once the degraded coral terrace was reached at this level.

TP 14 (6.53m asl) was located in the far east of the site at the north-eastern corner of the current siman-lo, close to the Ifo River (Fig. 3.4). Its height above sea level was the lowest of any of the test pits by some margin. This lack of elevation proved to be somewhat revealing as soon as excavation began. Beneath a thin humic layer of topsoil, concentrated water worn coral cobbles and boulders were revealed which continued to a depth of 100cm bd, at which point the excavation was terminated. The matrix was completely devoid of midden materials. Apart from the more recent humic accumulation the test pit comprised solely of remnant beach deposit.

TP 15 (8.88m asl) was the most northern of the test pits, located on the top of a low lying north-south aligned mound feature that had been cut by the logging road in 1988 (Fig. 3.4). In 1996 this part of the site was covered by secondary forest. Midden remains were sparse and worn. Three distinct layers were identified (Fig. 3.5). Excavation results from this part of the site indicate that it is largely outside the area of settlement associated with ceramic use.

Layer 1 (10–50cm bd): This layer comprised a black (10YR 2/1) humic topsoil with frequent water worn coral and basalt cobbles. Little midden was recovered (2 plain sherds).

Layer 2 (50–100cm bd): From 50cm bd decreasing cobble content and increasing sand characterised Layer 2. Five plain sherds only were recovered.

Layer 5 (100cm bd): Abruptly at 100cm bd the coral terrace was revealed.
Mangaasi test pits
A total of 18 test pits (23.5m²) were excavated at the Mangaasi site from 1996 through to 1999. Due to the complex nature of the stratigraphy and the chosen excavation strategy it was necessary to assign all layers that were found across the site a numeric label. In the case of the tephra layers (2 and 5) Roman numerals have been added to further distinguish variation. These layers only can be correlated across the whole site. This is in contrast to other layers where differentiation within a layer is shown by the addition of a letter to a layer’s numeric designation. These letter designations are not correlated across the site but are specific to individual test pits. The layers are not labelled serially and in some cases numeric inversion was inevitable. All 18 test pits have been illustrated (Figs. 3.10–3.14). The descriptions of the test pit stratigraphy below have been established through a combination of sedimentary and culturally defined layers. A total of 18 distinctive layers and/or primary cultural horizons were identified across the site (see Chapter 3).

TP 1 (9.22m asl), the first test pit excavated in 1996, was located adjacent to Garanger’s 1967 excavation. It was designed to locate and further clarify the stratigraphy which had been defined during the earlier excavations (Fig. 3.12). In 1998 TP 15 was excavated adjacent to TP 1 in order to collect a greater sample of the Mangaasi ceramics and conduct a further reassessment of the stratigraphy. The descriptions of the layers below correlate directly with those recorded in TP 15 (Fig. 3.12).

Layer 1 (15–40cm bd): This layer consisted of a black (10YR 2/1) humic topsoil (as with all test pits) with concentrations of coral pebbles from former house floors. It is associated with an aceramic period of occupation post dating the eruption of Kuwae. This layer graded into the layer below with an increasing tephra content with depth.

Layer 2ii (40–70cm bd): From this depth sediment consisted of a very dark gray (10YR 3/1) developing soil with a high tephra content (weathered Kuwae). The concentrated coral pebbles were no longer present. Midden material was sparse and the worn nature of the ceramics indicated that they were in secondary deposition.

Layer 3a (70–100cm bd): This layer consisted of an increasingly sandy very dark gray (10YR 3/1) sediment with an increased midden and coral cobble content. Ash lenses were also recorded towards the lower level of this layer. This was the first indication of an in situ occupational horizon associated with ceramics, all of which are Mangaasi-style sherds. A dispersed charcoal sample from this layer (70–90cm bd) returned a radiocarbon determination of 1310±130 BP (ANU–10640) 1509–953 BP. This is one of the few dates related to this later period of ceramic use and quite probably very close to the termination of ceramic use in the area.

Layer 4a (100–110cm bd): This layer consisted primarily of a white (10YR 8/2) storm deposited marine sand. This deposit was either related to a very violent cyclone or tectonically influenced marine activity which may have occurred over some time period, evidence for which is seen in the layer below. The presence of frequent pumice within the matrix lends support to tectonic influence, potentially in the form of a series of tidal waves.

Layer 4b (110–140cm bd): Directly beneath the marine sand deposit appeared concentrated coral cobbles and boulders set within a very pale brown (10YR 7/3) sand matrix. The nature of this deposit lends further support to the tidal wave scenario. Pumice was again present. Midden materials were recovered from this layer but have been invariably heavily mixed amongst the marine deposited matrix. A dispersed (110–130cm bd) charcoal sample from this layer returned a completely anomalous date of 106.5±2.4%M (ANU–10641) Modern*.

Layer 3b (140–180cm bd): Rather suddenly the concentrated coral cobbles and boulders disappeared to be replaced by a black (10YR 2/1) sandy soil. This represented an occupation horizon sandwiched between the marine deposited material above and the former foreshore deposit below. Midden material was more frequent and included shell, charcoal and pottery, all of
which was Mangaasi-style. Two radiocarbon dates were gleaned from the lower level of this layer. One date of 3040±140 BP (ANU-10642) 3551-2790 BP* from a dispersed charcoal sample (160–170cm bd) can be rejected as being clearly inconsistent with the ceramic remains. A marine shell sample date from the same level returned a much more realistic date of 2480±60 BP (ANU-10643) 2300–1975 BP.

Layer 11 (180–265cm bd): The former foreshore comprising of marine sand and coral cobbles and branches was reached at 180cm bd. Midden remains immediately became very sparse. Excavation continued to a depth of 265cm bd with little change in the matrix. Occasional very water worn sherds were recovered to the bottom of the excavation. The few rim forms recovered could be identified as Erueti-style indicating that an earlier settlement had once been located further inland.

TP 2 (10.13m asl) was located up-slope (almost 1m higher) and 25m east of TP 1 with which it demonstrated a broadly similar stratigraphic record (Fig. 3.15).

Layer 1 (10–20cm bd): This layer consisted of the black (10YR 2/1) humic topsoil with concentrations of coral pebbles providing evidence of former house floors. This layer graded into the layer below with an increasing tephra content with depth.

Layer 2i (20–50cm bd): At this depth the very dark gray (10YR 3/1) layer became increasingly rich in tephra. It represented a developed soil with a major component comprising of weathered Kuwae tephra. This layer graded into the layer below.

Layer 2ii (50–70cm bd): This layer consisted primarily of weathered Kuwae, although somewhat less weathered than the layer above as indicated both by its dark gray (10 YR 4/1) colour and less soil content. An abrupt change in the makeup of the layer below provided a clear boundary.

Layer 3a (70–170cm bd): At this depth an in situ cultural layer associated with Mangaasi-style ceramics appeared. It consisted of very dark gray (10YR 3/1) charcoal-rich silt with frequent medium to large coral cobbles, many of which were fire-blackened. The layer was somewhat mixed in the upper level due to later gardening activity. Recovered midden materials included pottery, shellfish, and bone. Charcoal and ash lenses were recorded throughout much of the layer. The lower levels of the layer became increasingly sandy and branch coral also became more frequent. A dispersed charcoal sample from the mid level (120–130cm bd) of this layer returned a radiocarbon determination of 1660±90 BP (ANU–10646) 1816–1349 BP.

Layer 4 (170–210cm bd): An abrupt change at 170cm bd revealed the remains of marine deposited debris. The matrix consisted of unconsolidated branch coral, light gray (10YR 7/1) marine sand and coral cobbles and boulders. This accumulation was the result of tidal wave or similarly violent cyclonic activity. Water worn pottery which had been churned up from the foreshore deposits was recovered throughout this layer.

Layer 3b (210–225cm bd): This layer consisted of a very dark gray (10YR 3/1) charcoal rich sediment with an increased midden content. The matrix was very similar to Layer 4 above. A dispersed charcoal sample from the upper level (210–220cm bd) of the layer returned an AMS date of 2340±50 BP (OZC829) 2467–2208 BP which corresponds well with a date of 2300–1975 BP from the same layer in TP 1. Little of the recovered pottery was diagnostic.

Layer 11 (260–290cm bd): From 260cm bd the former foreshore was revealed. This layer was excavated to a depth of 290cm bd at which point the excavation was terminated. Occasional water worn sherds of pottery were recovered throughout this layer. All rim forms were Erueti-style, indicating again that an earlier settlement had been located further inland.

TP 3 (10.55m asl) was another 25m east of TP 2 and at a similar elevation. Excavation demonstrated that although the stratigraphy of TP 3 could be directly correlated with that of TPs 1 and 2, it was
largely outside the area of settlement associated with ceramic use (Fig. 3.10). Recovered midden materials were either in secondary deposition or represented ephemeral in situ occupation.

Layer 1 (10–40cm bd): This layer consisted of the ubiquitous black (10YR 2/1) humic topsoil with concentrated coral pebbles. A dispersed (25–30cm bd) charcoal sample returned a radiocarbon determination of 490±60 BP (ANU-10647) 629–463 BP. This layer graded into the layer below with an increasing tephra content with depth.

Layer 2i (40–80cm bd): From 40cm bd a very dark gray (10YR 3/1) developed soil, largely derived from weathered Kuwae tephra, was in evidence. A dispersed (30–50cm bd) charcoal sample returned a radiocarbon determination of 330±60 BP (ANU-10648) 510–160 BP.

Layer 2ii (80–140cm bd): This layer was a dark gray (10YR 4/1) developed soil, again primarily comprising weathered Kuwae tephra, although its colour and decreased soil content were an indication of less weathering than seen in the layer above. Two dispersed charcoal samples from 90–110 and 130–140cm bd respectively returned radiocarbon determinations of 98.5±1.5%M BP (ANU-10649) 246–0 BP* and 2220±130 BP (ANU–10650) 2708–1897 BP*. Neither were particularly useful for the dating of the layer. The first can clearly be rejected as anomalous while ANU–10650 may relate to the lower (Layer 3) cultural horizon.

Layer 4 (140–160cm bd): This layer consisted substantially of branch coral and worn coral cobbles and appears to represent the edge of the tidal wave deposit. A dispersed (150–160cm bd) charcoal sample from amongst this material returned a completely anomalous date of 6190±80 BP (ANU-10651) 7268–6807 BP. The charcoal was perhaps derived from driftwood of some kind.

Layer 3 (160–175cm bd): Very dark gray (10YR 3/1) sediment with concentrated coral cobbles, patches of ash and charcoal along with other midden materials characterised this Mangaasi cultural horizon. The layer however clearly had been somewhat disturbed and mixed by the later marine activity above along with some mixing of foreshore deposits below. This mixing was reflected in the problematic dating of the layer. A single marine shell (170cm bd) and a dispersed (170–180cm bd) charcoal sample respectively returned radiocarbon determinations of 2850±50 BP (ANU–10652) 2732–2442 BP and 130.0±2.4%M (ANU–10653) Modern*. The charcoal date presumably reflects modern tree root contamination and the marine shell seems likely to relate to the Layer 11 deposits.

Layer 11 (175–290cm bd): Abruptly at this level the former foreshore appeared. It has been divided up into a number of sub-layers to illustrate the stratified nature of the deposit and directly position a number of radiocarbon determinations. Layer 11a (175–200cm bd) consisted principally of semi-cemented coarse coral sediment. Layer 11b (200–220cm bd) consisted of more loosely compacted cobble pebbles. A dispersed (210–230cm bd) charcoal sample from this layer returned a date of 2290±100 BP (ANU–10654) 2710–2044 BP. Finally Layer 11c (220–290cm bd) consisted of more coarse coral sediment such as cobbles and boulders. A shell from the upper level (220cm bd) of this layer submitted for dating returned a radiocarbon determination of 3690±60 BP (ANU–10655) 3752–3449 BP, a date clearly un-related to the human occupation of the area. The dispersed charcoal sample however taken from the lowest level (270–290cm bd) of the layer returned a more realistic date of 2450±50 BP (OZC830) 2736–2348 BP for the initial human occupation of this area of the site assuming the charcoal had a cultural origin. Occasional water worn pottery (all rims were indicative of Erueti-style pottery) was found throughout the foreshore deposit again illustrating earlier settlement further inland.

Layer 13 (290cm bd): The former reef was revealed at a depth of 7.65m asl.

TP 4 (11.23m asl) was located further inland (35m south east) from TP 1 and the area originally excavated by Garanger. The ground surface was some 2m higher in elevation. It was the first test pit (1996) to reveal in situ Erueti-style pottery (Fig. 3.11).

Layer 1 (10–55cm bd): This layer was a somewhat thicker version of the humic black (10YR 2/1) topsoil layer (as per all test pits) found across the site. No midden materials were recovered.
In the upper level of the test pit, concentrations of coral pebbles relating to former house floors were noted. This layer graded into the layer below with an increasing tephra content with depth.

Layer 2i (55–100cm bd): This very dark gray (10YR 3/1) developing soil layer appeared to be principally made up of weathered Kuwae tephra. Much of the layer was disturbed however by a 20cm deep pit feature cut from the upper level of the layer. This was largely filled with coral pebbles along with a sparse component of black soil. Midden remains recovered from the pit feature included shellfish, bone and charcoal. A dispersed charcoal sample from the lowest level of the pit feature returned a date of 220±60BP (ANU–10656) 431–0 BP, indicating it was related to relatively late activity in the area. This layer graded into the one below.

Layer 5i (100–140cm bd): This dark gray (10YR 4/1) silty sediment layer was again made up largely of weathered tephra. Two radiocarbon dates on shell and charcoal respectively from the middle (110–130cm bd) of the layer (2410±60BP [ANU-10657] 2179–1889 BP and 2090±50 BP [OZC831] 2297–1928 BP) strongly suggest that the weathered tephra in this case is related to the Nguna eruption. Midden remains were sparse and seem most likely to be the result of secondary deposition and disturbance.

Layer 5ii (140–170cm bd): This layer again consisted largely of a grayish brown (10YR 5/2) developing soil derived from the weathering of the Nguna tephra. At this depth it was somewhat less weathered and patches of more pure tephra were noted across the square. More frequent midden began to appear in the lower levels of this layer but it clearly derived from the layer below. This layer represented the interface of the developing soils and the in situ cultural remains below.

Layer 9 (170–230cm bd): This black (10YR 2/1) greasy silty sediment layer represented an in situ cultural deposit which included concentrated coral and basalt cobbles, ash and charcoal, shellfish, bone, pottery and several shell artefacts. All the pottery from this layer was of Erutti-style. A dispersed charcoal sample from the upper level (170–190cm bd) of this layer returned a date of 2380±60 BP (ANU–10658) 2711–2213 BP and from the lower level another dispersed charcoal sample (210–230cm bd) returned a date of 2520±60 BP (ANU–10659) 2754–2357 BP.

Layer 11 (230–250cm bd): Abruptly at a depth of 230cm bd the former foreshore was encountered. Several water worn pottery sherds were recovered from the 20cm deep sondage excavated into this layer indicating earlier settlement was located further inland from this test pit. Excavation was terminated at this level.

**TP 5** (11.61m asl) was positioned 25m south of TP 4 in order to further define the limits of the Erutti phase of the settlement. A thin lens of in situ cultural material was identified at a depth of 140cm bd (Fig. 3.11). This test pit marked the landward edge of the early settlement.

Layer 1 (5–40cm bd): This layer consisted of a black (10YR 2/1) humic topsoil (as per all test pits). Deposits of concentrated coral pebbles, remains of former house floors, were recorded throughout the upper level of the layer.

Layer 2ii (40–80cm bd): An increasing tephra (Kuwae) content and a decrease in coral pebble content defined this very dark gray (10YR 3/1) developed soil. Midden remains were sparse and were in secondary deposition. This layer became increasingly lighter coloured and tephra-rich with depth, grading into the layer below.

Layer 2iii (80–100cm bd): This layer consisted primarily of light brownish gray (10YR 6/2) Kuwae tephra. Midden remains were, not surprisingly, somewhat sparse.

Layer 5i (100–140cm bd): From 100cm bd another dark gray (10YR 4/1) developed soil was encountered. It consisted largely of weathered Nguna tephra. Increased midden materials were recovered from the bottom level of the layer. These appeared to be derived both from the layer below and later dispersed remains.

Layer 9 (140–170cm bd): This layer was characterised by a black (10YR 2/1) greasy sediment with concentrated coral and basalt cobbles and midden materials. It represented a thin layer of an in situ cultural deposit associated with Erutti-style pottery.
Layer 11 (170–417 cm bd): The cultural horizon abruptly terminated at 170 cm bd on top of the former foreshore. Concentrated coral sand, pebbles, cobbles and occasional boulders comprised this layer. Midden materials immediately became very sparse and were only recovered from the upper most level (170–180 cm bd) of the layer. The test pit was excavated down to the former reef (Layer 13) at a depth of 417 cm bd (7.44 m asl), a similar height above sea level to the reef identified in TP 3 (7.65 m asl).

TP 6 (12.48 m asl), located some 25 m east of TP 5, and almost 1 m higher, confirmed that the area of concentrated settlement lay toward the creek to the west. The stratigraphy of this test pit consisted primarily of a series of weathered and more pure tephras (Fig. 3.13). The dramatic accumulation of tephras in this area of the site is due to its location at the bottom of the nearby slope. Scattered midden material, largely ceramics, recovered from amongst the tephras was clearly in secondary deposition.

Layer 1 (10–50 cm bd): This layer consisted of a black (10YR 2/1) humic topsoil with patches of coral pebbles (as per all test pits). At the interface of this layer and Layer 2I, patches of unweathered Kuwae tephra were recorded. This material appears to be related to a nearby slope failure event which is seen more clearly in the stratigraphy of TP 7.

Layer 2I (50–90 cm bd): From 50 cm bd a tephra-rich, very dark gray (10YR 3/1) developed soil was in evidence. This layer was derived primarily from weathered Kuwae tephra. Midden remains were sparse.

Layer 2III (90–160 cm bd): This largely sterile layer consisted primarily of more pure, light brownish gray (10YR 6/2) Kuwae tephra. At a depth of 160 cm bd the tephra appeared more finely sorted and more gray colored. This appeared to simply represent some stratification of the tephra deposit. There was a clear distinction between this layer and the layer below.

Layer 5I (180–230 cm bd): This dark gray (10YR 4/1) developed soil consisted largely of weathered Nguna tephra. Occasional coral cobbles were noted throughout. Midden content increased at the lower level of this layer but the worn nature of the pottery suggested it was largely in secondary deposition or had been exposed on the surface for a long period. All pottery was Mangaasi ware.

Layer 11 (230–260 cm bd): At a depth of 230 cm bd very cemented coral boulders and cobbles were encountered. This signalled the appearance of the upper levels of the former foreshore. Excavation terminated at this point.

TP 7 (13.75 m asl) was located at the far east of the site at the bottom of the rapidly rising slope. Due to its location near the base of the slope much thicker deposits of developed soils from weathered tephras along with more pure tephra layers were in evidence. Some evidence of slope failure in the form of later deposits of pure Kuwae tephra, was also recorded (Fig. 3.13).

Layer 1 (+10–45 cm bd): This layer consisted of a very dark gray (10YR 3/1) humic soil with occasional coral cobbles. The patches of concentrated coral pebbles found across all other test pits on more level ground were absent in this test pit.

Layer 2III (45–60 cm bd): At a depth of 45 cm bd patches of Kuwae tephra were recorded. As further excavation revealed this tephra, somewhat enigmatic stratigraphically, appeared to be the result of slope failure.

Layer 2I (60–100 cm bd): This layer was a very dark gray (10YR 3/1) developed soil largely comprising weathered Kuwae tephra. Midden remains were completely absent. A very well defined layer change existed between this weathered tephra and the more pure Kuwae tephra below.

Layer 2III (100–140 cm bd): This layer consisted purely of light brownish gray (10YR 6/2) unweathered Kuwae tephra. Not surprisingly midden remains were non-existent. The tephra provided a very clearly defined layer separation.
Layer 5i (140–200cm bd): A dark gray (10YR 4/1) developed soil characterised this layer which consisted largely of weathered Nguna tephra. Mangaasi-style pottery appeared at the top level of the layer, indicating ephemeral settlement in the area. A dispersed charcoal sample from between 145–170cm bd returned an AMS date of 1670±60 BP (OZD580) 1710–1413 BP. The layer became increasingly lighter coloured with depth and graded into the layer below which consisted of less weathered Nguna tephra.

Layer 5ii (200–320cm bd): This layer consisted primarily of gray (10YR 5/1) Nguna tephra, its thickness due to rapid buildup at the base of the slope. Midden remains were very sparse and indicate that this part of the site was outside the area of concentrated settlement. A dispersed charcoal sample recovered from the lower level (270–290cm bd) returned an AMS date of 2540±50 BP (OZD581) 2753–2363 BP. This pre-dates the Nguna caldera forming event and appears more likely to be associated with mixed ephemeral midden remains once sandwiched between the tephra and the former foreshore below. The recovered rim forms were all indicative of Erueti-style pottery.

Layer 11 (from 320cm bd): From 320cm bd large coral boulders marking the top of the former foreshore were encountered. A very similar matrix at a correspondingly similar level (10.55cm asl) was identified in TPs 6 and 8 (TP 6, Layer 5 [10.18m asl]; TP 8, Layer 5 [9.83m asl]).

TP 8 (11.43m asl) was located 25m south of TP 5 in order to both further define the limits of the Erueti phase of settlement and test further inland for any evidence of an earlier occupation. The test pit proved to be largely outside the area where any evidence of early settlement was located. The stratigraphy consisted primarily of sterile soils developed from weathered tephras (Fig. 3.17). Midden remains were sparse throughout and appeared to be in secondary deposition.

Layer 1 (10–35cm bd): This layer comprised the black (10YR 2/1) humic topsoil with patches of concentrated coral pebbles indicative of former house floors. Scattered human bone was retrieved from the layer which was clearly associated with a burial cut feature recorded in the layer below.

Layer 2i (35–55cm bd): A decrease in the level of coral pebble content and a corresponding increase in tephra content characterised this layer of developing soil. The very dark gray (10YR 3/1) matrix was derived primarily from weathered Kuwae tephra. A burial feature had been cut into the layer which related to the post Kuwae (i.e. post dates 600 BP) settlement of the area.

Layer 2ii (55–100cm bd): From a depth of 55cm bd the stratigraphy consisted primarily of less weathered, dark gray (10YR 4/1) Kuwae tephra. Later settlement appears to have caused some disturbance to the layer which is further highlighted by the presence of patches of pure Kuwae tephra amongst the matrix.

Layer 5i (100–160cm bd): This dark gray (10YR 4/1) silty matrix consisted of a developed soil derived from weathered Nguna tephra. It became increasingly lighter brown with depth along with a corresponding increased content of less degraded tephra.

Layer 11 (160–195cm bd): This layer consisted of cemented coral boulders and cobbles laying on top of the former foreshore deposit. No midden materials were recovered. Excavation was terminated at a depth of 195cm bd.

TP 9 (10.23m asl) was located some 50m south, and over 1m higher in elevation, than Garanger’s original 1967 excavations. The excavation of TP 4 (1996) suggested that earlier settlement lay further inland and TP 9 confirmed this. Its lowest layers marked the initial settlement in the Mangaasi area associated with Erueti style ceramics (Fig. 3.12). These demonstrated change over time within the over 150cm of cultural deposit.

Layer 1 (5–20cm bd): This layer consisted of the ubiquitous black (10YR 2/1) humic topsoil (as per all test pits) with patches of concentrated coral pebbles indicating the presence of former house floors. It graded into the layer below.
Layer 2i (20–40 cm bd): This very dark gray (10YR 3/1) developed soil was largely derived from weathered Kuwae tephra. The concentrated coral pebbles seen in the layer above had disappeared and the tephra content had increased. Midden remains were sparse.

Layer 9a (40–90 cm bd): Rather abruptly at 40 cm bd a black (10YR 2/1) gritty sediment was encountered. Amongst the matrix were concentrations of cobbles, ash, charcoal and frequent midden remains. This represented a cultural horizon associated with late Erueti-style ceramics. A dispersed charcoal sample from the lower level (60–80 cm bd) of the layer returned a radiocarbon determination of 2180±130 BP (ANU–10801) 2467–1871 BP. A lens of ash was recorded at a depth of 90–95 cm bd. Midden materials from the layers above and below were mixed amongst the ash. A continuation of this lens was recorded in TP 12 (Fig. 3.12).

Layer 9b (95–105 cm bd): This layer consisted of a similar matrix to the cultural layer above but was separated by the ash. It was a very dark gray (10YR 3/1) silty sediment with concentrated cobbles, ash, charcoal and frequent midden materials, such as shell, bone and pottery. The pottery was all of Erueti-style. The layer was sandwiched between an ash lens above and a storm-deposited marine sand below. One shell sample and two dispersed charcoal samples were dated from this layer. The marine shell (80–100 cm bd) returned a date of 2820±50 BP (Wk–6602) 2716–2359 BP and the two charcoal samples (90–100 cm bd and 95–105 cm bd respectively) returned dates of 2960±140 BP (ANU–10802) 3468–2776 and 2550±110 BP (ANU–10803) 2855–2347 BP.

Layer 9c (115–155 cm bd): This layer was similar to the upper cultural horizons comprising of a very dark gray (10YR 3/1) silty sediment including concentrations of cobbles, ash, charcoal and midden materials. The pottery consisted solely of Erueti-style sherds. One marine shell sample (110–130 cm bd) and a dispersed (155–165 cm bd) charcoal sample respectively returned radiocarbon determinations of 2790±50 BP (Wk–6603) 2702–2344 BP and 2550±130 BP (ANU–10800) 2921–2336 BP.

Layer 8a (105–115 cm bd): This layer consisted primarily of a white (10YR 8/1) storm deposited marine sand. Water-rolled pottery was the only midden material recovered from the layer. This deposit demonstrated the close proximity of the earlier settlement to the former foreshore.

Layer 9d (170–205 cm bd): This layer was similar to the above cultural horizon and was characterised by an identical matrix. It lay directly on top of the former foreshore. A series of dates were determined from samples taken from different levels of the layer. They included dispersed (175–185 cm bd and 195–205 cm bd) charcoal samples which returned dates of 2420±80 BP (ANU–10798) 2744–2214 BP and 2790±110 BP (ANU–10799) 3236–2741 BP. A marine shell sample collected from the 195–205 cm bd level returned a date of 3050±80 BP (ANU–10796) 3000–2700 BP while one from the 180–190 level returned an AMS date of 2580±50 BP (OZD582) 2776–2492 BP. Several Arapus-style rims were recovered from this lowest cultural layer but they were very much a minor component amongst a cultural horizon dominated by Erueti-style ceramics.

Layer 11 (205–230 cm bd): At this depth the former foreshore was revealed. It consisted largely of water-rolled coral cobbles and branches and sloped slightly both towards the creek and the sea. At a depth of 230 cm bd excavation was terminated. At this depth the layer was largely sterile apart from occasional sherds and scattered charcoal which had clearly filtered down from the layer above. A dispersed charcoal sample from the interface of the cultural horizon and the former foreshore returned an anomalous radiocarbon determination of 1350±80 BP (ANU–10797) 1685–927 BP.

TP 10 (10.02 m asl) was located between TP 9 and TP 1 in an attempt to locate a section of stratigraphy that demonstrated the transition from the Erueti to Mangaasi cultural horizons. The test pit proved to be well positioned (Fig. 3.12).
Layer 1 (15–40cm bd): This layer consisted of a black (10YR 2/1) humic topsoil with patches of concentrated coral gravel and pebbles indicating the presence of former house floors. It graded into the layer below.

Layer 2i (40–60cm bd): This very dark gray (10YR 3/1) developing soil displayed an increasing tephra content which coincided with a decrease in coral gravel and pebble content. It consisted primarily of weathered Kuwae tephra. Midden remains were sparse and clearly in secondary deposition. The layer graded into the layer below with a decreasing tephra content with depth.

Layer 3a (60–100cm bd): This layer comprised a black (10YR 2/1) silty charcoal rich sediment. It represented an occupational horizon associated with Mangaasi-style ceramics. From the bottom (90–100cm bd) of the layer a dispersed charcoal sample returned an AMS date of 2250±60 BP (OZD578) 2353–2119 BP. Frequent coral cobbles and midden remains were recovered from throughout the layer.

Layer 3b (100–140cm bd): This layer was similar to above but with a greatly increased coral cobbles and midden content. Patches of ash and charcoal were also noted. Although there is clearly some mixing of deposits, this layer and the layer below demonstrate the transition from Mangaasi to Erueti cultural horizons. Mangaasi pottery dominated in this layer although occasional Erueti-style sherds were encountered. Erueti-style pottery dominated from Layer 9a below. A radiocarbon determination on a marine shell from this layer (110–120cm bd) returned a date of 2670±50 BP (Wk-6598) 2473–2280 BP.

Layer 9a (140–160cm bd): There was no identifiable change in the matrix of this layer to that which had been recorded above but the ceramic remains were dominated by Erueti-style ceramics. Two marine shell samples taken from two different levels of the layer were submitted for dating. They returned radiocarbon determinations of 2740±50 BP (Wk-6599) 2665–2321 BP (140–150cm bd) and 2910±45 BP (Wk-6600) 2755–2601 BP (150–160cm bd).

Layer 8 (160–170cm bd): At a depth of 160cm bd the cultural horizon was abruptly interrupted by a marine deposited white (10YR 8/1) sand related to cyclonic activity. This layer further highlighted the proximity of the settlement to the former foreshore.

Layer 9b (170–200cm bd): Sandwiched between the marine deposited sand and the former foreshore is this lowest cultural horizon consisting of black (10YR 2/1) sandy sediment with concentrated coral cobbles and midden materials. The recovered ceramics were exclusively Erueti-style sherds. A marine shell from the lower level (180–190cm bd) returned a radiocarbon determination of 3160±50 BP (Wk-6601) 3077–2805 BP and a dispersed charcoal sample from 190–200cm bd returned an AMS date of 2620±110 BP (OZD579) 2950–2357 BP.

Layer 11 (200–225cm bd): The former foreshore was reached at a depth of 200cm bd and excavation continued to a depth of 225cm bd. Sparse water worn sherds were recovered from throughout this level of the foreshore.

TP 11 (9.55m asl) was the most northern of all the test pits some 25m north of TP 3 but located on the same north-east south-west aligned beach terrace where Garanger had carried out his earlier excavations (Fig. 3.10). This area of the site proved to be on the periphery of the settlement associated with ceramic use. The stratigraphy was somewhat mixed due to more recent gardening and settlement activities. Recovered midden remains were sparse and included Mangaasi-style pottery.

Layer 1 (10–30cm bd): This layer consisted of a black (10YR 2/1) humic topsoil (as per all test pits). Concentrated patches of coral gravel and pebbles, indicative of former house floors, were recorded in the upper level of the layer.

Layer 2i (30–90cm bd): Much of this very dark gray (10YR 3/1) developed soil was derived from weathered Kuwae tephra. However as noted above, the layer was somewhat mixed and an
increased midden content with depth hinted at the presence of a cultural horizon. It was not possible to define whether the midden remains were derived from more intact deposits nearby or were in situ but mixed. The lower level (90–110cm bd) of this layer became increasingly sandy until the former foreshore was revealed.

Layer 11a (110–120cm bd): This layer was made up primarily of a light gray (10YR 7/1) marine deposited sand which lay directly on top of the former foreshore.

Layer 11b (120–170cm bd): The former foreshore was reached at a depth of 120cm bd. It consisted of loosely compacted coral branches, cobbles and boulders amongst a gritty sand. Worn pottery found was found throughout this layer, indicating that earlier settlement had occurred further inland. Excavation was terminated at a depth of 170cm bd.

**TP 12** (10.14m asl) was located between TP 9 and 10 in order to further define the relationship of the Erueti and Mangaasi cultural horizons. The excavation revealed a somewhat similar stratigraphy (Fig. 3.12) to that in TP 9. A greater sample of Erueti-style ceramics and artefacts were recovered.

Layer 1 (10–30cm bd): This layer consisted of the ubiquitous black (10YR 2/1) humic topsoil with concentrations of coral pebbles from former house floors appearing in the upper level.

Layer 2i (30–60cm bd): This very dark brown gray (10YR 3/1) developed soil was derived primarily from weathered Kuwae tephra. Increased midden materials were recovered with depth but these had been clearly disturbed from the lower cultural horizon.

Layer 9a (60–90cm bd): Rather abruptly concentrated burnt coral and basalt cobbles along with concentrated midden signalled the appearance of an in situ cultural horizon. The matrix consisted of a black (10YR 2/1) sandy sediment with patches of ash and frequent charcoal. All of the recovered ceramics were Erueti-style sherds. At a depth of 90–105cm bd an ash lens was recorded in the southern half of the test pit. It would seem to correspond with a similar fire ash recorded in TP 9. Midden from the adjacent layers had been mixed amongst it. It provided a boundary between this layer and the layer below.

Layer 9b (105–160cm bd): This layer represented a continuation of the cultural horizon above (Layer 9a) and below (Layer 9c). The matrix again consisted of a black (10YR 2/1) charcoal-rich sandy sediment with concentrated coral and basalt cobbles from fire-rakeout. Midden remains were frequent including shellfish, bone and pottery (all Erueti-style sherds).

Layer 8 (160–165cm bd): This thin layer consisted principally of a light gray (10YR 7/1) marine deposited sand related to a similar cyclonic episode as seen in TP 9 (Layers 8 and 8a). This is further confirmation of the proximity of the settlement to the original foreshore.

Layer 9c (165–185cm bd): This layer represented the earliest in situ cultural deposit found in this test pit. The matrix consisted of a black (10YR 2/1) charcoal-rich sandy sediment with frequent coral and basalt cobbles. Midden remains were concentrated and included shellfish, bone, pottery and other artefacts. All pottery was Erueti-style except for one sherd which was a distinctive Arapus-style rim.

Layer 11 (185–406cm bd): The marine deposited former foreshore was encountered at a depth of 185cm bd. It consisted of light gray (10YR 7/1) sand and coral debris such as branches, cobbles and boulders. Sparse water worn midden materials were found throughout this layer down to the reef platform below, indicating that earlier settlement had been located further inland (i.e. in the area of TP 9). Layer 13 (406cm bd): The top of the former reef was reached at a depth of 406cm bd (6.08m asl).

**TP 13** (9.91m asl) was located 25m further south of TP 9 in order to further delineate the area of early settlement. Much of the stratigraphy however consisted of alluvial sediments deposited by the nearby Pwanmwou Creek (Fig. 3.14). This part of the site was clearly outside the area of
settlement associated with ceramic use. Sparse midden remains, including pottery were found throughout the stratigraphy but were clearly in secondary deposition. Decorated sherds demonstrated an affinity with Erueti-style ceramics and may have derived from localised disturbances.

Layer 1 (0–35cm bd): This layer consisted of a black (10YR 2/1) humic topsoil. Patches of coral gravel/pebbles were noted. These are the remains of former house floors which relate to more recent settlement of the area. Sparse scattered midden, in secondary deposition, was recovered.

Layer 2i (35–65cm bd): An increased tephra content and corresponding disappearance of coral pebbles differentiated this layer from the layer above. The very dark gray (10YR 3/1) developed soil was derived largely from weathered Kuwae tephra. Several patches of more pure tephra were also noted within the matrix.

Layer 5i (65–90cm bd): At a depth of 65cm the developed soil changed to a dark gray (10YR 4/1) which was primarily derived from weathered Nguna tephra. This layer graded into the layer below with an increasing non-weathered tephra content.

Layer 5ii (90–150cm bd): This layer was characterised by a grayish brown (10YR 5/2) sediment comprising principally of less weathered Nguna tephra. Midden materials became increasingly sparse. The stratigraphy below this layer, to the bottom of the excavation at 250cm bd, was consisted largely of alluvial deposits. They were characterised by layers of re-deposited former foreshore and fine silty sands. Midden materials throughout this lower deposit were sparse and were clearly in secondary deposition. All the recovered sherds were heavily worn.

Layer 7a (150–200cm bd): This layer consisted principally of cemented coral cobbles and pebbles in a fine white (10YR 8/1) silty sand. A colour change in the sand was noted mid way through the layer (7b) where from 180cm bd it was iron stained. The sparse midden consisted solely of heavily water rolled pottery.

Layer 7c (200–220cm bd): At 200cm bd the coral debris was replaced by a sterile white (10YR 8/1) sand, a further indication of the alluvial nature of the deposit.

Layer 7d (220–240cm bd): Further fine alluvial sand was recorded at this depth, but it was finer and more light gray (10YR 7/1) in colour.

Layer 7e (from 240cm bd): At this depth white (10YR 8/1) coral sand, pebbles and cobbles were encountered. This may be evidence of a marine deposit marking the former foreshore or a further alluvially derived layer. Excavation was terminated at 250cm bd.

TP 14 (8.6m asl) was the most western test pit excavated at the Mangaasi site. Designed to further delineate the boundaries of the early settlement associated with ceramic use it was located down slope and some 25m west of TP 10. However much of the stratigraphy consisted of alluvial deposits (from 80cm bd) due to its proximity to the Pwanmwou Creek (Fig. 3.14). Sparse water worn midden remains were found throughout this alluvial deposit, indicative of earlier settlement further inland.

Layer 1 (10–30cm bd): This layer comprised a black (10YR 2/1) humic topsoil with little evidence of former settlement in the form of coral pebble concentrations associated with house floors. It graded into the layer below with an increasing tephra content.

Layer 2i (30–50cm bd): This very dark gray (10YR 3/1) developed soil derived primarily from weathered Kuwae tephra. Midden remains were sparse and in secondary deposition.

Layer 2ii (50–80cm bd): This dark gray (10YR 4/1) layer consisted of less weathered Kuwae. Within the matrix several patches of light brownish gray (10YR 6/2), more pure tephra were noted. From below the bottom of this layer the stratigraphy clearly consisted of alluvially deposited sediments.

Layer 7a (80–170cm bd): This layer consisted of alluvially re-deposited tephra with coral cobbles and boulders. Part of the layer may have consisted of the tidal wave deposit as seen in
other test pits (e.g. TP 1, 2, 3, 16) but alluvial activity has thoroughly transformed the stratigraphy.

Layer 7b (170–205cm bd): At a depth of 170cm bd the stratigraphy comprised an increasing light gray (10YR 7/1) sand content with a corresponding decrease in tephra content. Branch coral and pebbles were also noted.

Layer 7c (205–220cm bd): An increasing coral pebble content provided the distinction between this layer and the one above. A distinct change in the matrix of the layer below again provided a distinct delineation of layers.

Layer 7d (220–240cm bd): This layer consisted of an alluvially deposited, compacted grayish brown (10YR 5/2) sand with concentrated coral pebbles.

Layer 7e (240–255cm bd): This layer was yet another alluvial deposit with a similar matrix to the layer above but the sand was white (10YR 8/1).

Layer 7f (255–265cm bd): From a depth of 255cm bd the stratigraphy was characterised by large coral boulders set within a cemented white (10YR 8/1) sand. Excavation terminated at a depth of 265cm bd.

TP 15 (9.25m asl) was located immediately adjacent to TP 1 and Garanger’s areal excavation. Detailed descriptions of the stratigraphy are presented above (see TP 1 and Fig. 3.12).

TP 16 (9.6m asl) was located between TP14 and TP 10. It was designed to further define the stratigraphic relationships between the alluvially influenced deposits found in TP14 and those devoid of alluvial interference in TP 10. The stratigraphy of TP 16 (Fig. 3.14) was similar to TP 17 but with a greater marine deposited component.

Layer 1 (10–20cm bd): This layer comprised a black (10YR 2/1) humic topsoil with patches of concentrated coral pebbles from former house floors.

Layer 2i (20–35cm bd): The disappearance of the concentrated coral pebbles and a corresponding increased tephra content characterised this very dark gray (10YR 3/1) developed soil. It derived primarily from weathered Kuwae tephra. Midden remains were sparse.

Layer 3 (35–110cm bd): This layer consisted of a black (10YR 2/1) gritty matrix with concentrated coral and basalt pebbles and frequent midden remains. It represented a occupational horizon associated with Mangaasi style ceramics.

Layer 4 (110–150cm bd): This layer comprised a marine sand, large coral blocks and concentrated coral cobbles. It appeared to relate to the same tidal wave event recorded in TPs 1/15, 2, 3, and 17. It graded into the layer below, with a diminishing coral block content.

Layer 8 (150–190cm bd): This layer was also derived largely from marine deposits and consisted of sand and less frequent coral debris. Sparse water worn pottery only was recovered from throughout the layer but were clearly derived from foreshore deposits.

Layer 5iii (190–200cm bd): A further decrease in coral debris content and the presence of a tephra characterised this marine deposited light gray (10YR 7/1) silty sand layer. The tephra content seems likely to have derived from an eruption of Nguna c. 2200 BP.

Layer 11 (200–230cm bd): The former foreshore comprising of marine sand and coral cobbles and branches was reached at a depth of 200cm bd. Water worn pottery only was recovered to a depth of 230cm bd at which point the excavation was terminated.

TP 17 (9.72m asl) was located between TP 15 and 10, two test pits which displayed somewhat varied stratigraphies. TP17 was excavated to further clarify the stratigraphic relationship (Fig. 3.9 and 3.12) across this 25m gap.

Layer 1 (10–20cm bd): This layer comprised the black (10YR 2/1) humic topsoil with patches of coral pebbles indicative of earlier house floors. It graded into the layer below with an increasing tephra content with depth and a corresponding decrease in the coral pebble content.
Layer 2i (20–50cm bd): A very dark gray (10YR 3/1) developed soil characterised this layer which was derived from weathered Kuwae tephra. Midden remains were sparse and worn and clearly in secondary deposition.

Layer 3 (50–125cm bd): This layer consisted of black (10YR 2/1) sandy, charcoal rich sediment. Also included amongst the matrix were concentrated coral and basalt cobbles, shellfish, bone and ash. The layer represented an occupation horizon associated with Mangaasi-style ceramics. It was further subdivided into three layers based on concentrations of coral and basalt cobbles. The matrix of Layer 3a (50–75cm bd) included concentrated cobbles while a lesser frequency was noted in Layer 3b (75–100cm bd) with a return to more concentrated cobbles being noted in Layer 3c (100–125cm bd). A clearly defined boundary between this layer and the layer below was provided by a change to more sterile marine deposited sediments.

Layer 4a (125–180cm bd): This layer consisted primarily of a series of stratified marine deposited sediments which are described below. The same deposit is seen in a number of other test pits (e.g. TP1/15, TP2, TP 3 and TP 16). As already suggested it appears to have been either related to a very violent cyclonic event or tectonically influenced marine activity (i.e. tidal wave). There was no evidence of any in situ cultural horizons or humic accumulation separating the deposits which suggests the deposit built up over a short time period. The stratified deposits included Layer 4a (125–140cm bd) comprising concentrated coral pebbles, Layer 4b (140–155cm bd) a sterile white (10YR 8/1) marine sand, Layer 4c (155–165cm bd) included the marine sand but with a substantial coral pebbles and cobbles content, and finally Layer 4d (165–180cm bd) was a white (10YR 8/1) coarse marine sand. Sparse, heavily water worn, midden remains were recovered from throughout the deposit. Diagnostic sherds were all Erueti-style but in secondary deposition having been churned up from the foreshore deposits.

Layer 3d (180–190cm bd): Beneath the marine deposited sediments a further cultural horizon was identified. It consisted of a very dark gray (10YR 3/1) charcoal rich sediment with frequent coral cobbles. Shellfish, bone and pottery were recovered. The ceramics were all plain sherds but the layer would seem to correspond to Layer 6 in TP1/15 where the recovered sherds were overwhelmingly Mangaasi-style ceramics. Water worn Erueti-style sherds were recovered above and below this layer but appear to have derived from disturbed marine deposits.

Layer 5iii (190–205cm bd): A layer of tephra was recorded lying directly on top of the former foreshore. Gray (10YR 5/1) in colour this tephra seems most likely to relate to an eruption of Nguna c. 2200 BP. This is the northern most part of the site where it was recorded.

Layer 11 (205–230cm bd): The former foreshore comprising of coral gravel, cobbles and boulders was encountered at a depth of 205cm bd. Excavation continued to a depth of 230cm bd where very occasional heavily water worn sherds were recovered.

TP 18 (11.18m asl) was the only test pit excavated at Mangaasi in 1999. Located some 25m east of TP 4 it was designed to further define the boundaries of the early settlement associated with Erueti style ceramics. Excavation demonstrated that it largely lay outside the area of settlement associated with ceramic use (Fig. 3.10).

Layer 1 (10–40cm bd): This layer comprised a black (10YR 2/1) humic soil. It graded into the layer below, becoming lighter coloured along with an increasing tephra content.

Layer 2i (40–70cm bd): This very dark gray (10YR 3/1) developed soil layer was primarily derived from weathered Kuwae tephra. Midden remains were sparse. A clearly defined boundary could be seen between this layer and the layer below.

Layer 2iii (70–110cm bd): This light brownish gray (10YR 6/2) layer consisted of more pure Kuwae tephra, devoid of midden remains.

Layer 5i (110–180cm bd): This dark gray (10YR 4/1) developed soil derived primarily from weathered Nguna tephra. Midden remains were sparse which suggested this area of the site was on the periphery of the main settlement.
Layer 11 (180–230cm bd): At a depth of 180cm bd the former foreshore was encountered. It consisted of worn branch coral, cobbles and pebbles. Excavation continued to a depth of 230cm bd at which point midden remains were no longer in evidence. Further indication that this part of the site was outside the area of early settlement.

**Arapus Test pits**
A total of 24, 1 by 1m test pits were excavated at the Arapus site in 1999. Only three of those are described in any detail here, primarily to illustrate the stratigraphic relationships of the various ceramic traditions. It was at the Arapus site that an early phase of settlement, pre-dating anything identified at Mangaasi, was located. It is this earlier phase of settlement that is associated with Arapus-style pottery (now known as Arapus Ware). Arapus-style pottery was associated with initial settlement in the area and in a number of the test pits further inland (e.g. TP 14 and 17) the ceramics are almost exclusively Arapus-style sherds which date to c. 2900 BP. In other test pits (e.g. TP 4) the basal cultural layers included Arapus-style sherds which were sealed by later layers comprising exclusively of Erueti-style sherds. The three test pits (Fig. 3.15) below illustrate both the *in situ* Arapus cultural horizons and the transition to Erueti cultural horizons.

**TP 4** (10.21m asl) was located on a terrace some 10m above the live coral datum and revealed the transitional phase from Arapus to Erueti-style ceramics.

Layer 1 (0–25cm bd): This uppermost layer consisted of the ubiquitous black (10YR 2/1) humic topsoil found across the entire site. It graded into the layer below with an increasing tephra content.

Layer 6 (25–75cm bd): Layer 2 consisted of a very dark gray (10YR 3/1) developed soil, a large percentage of which was made up of weathered tephras. A patch of un-weathered Kuwae tephra was recorded in section. Occasional coral cobbles and sherds of Erueti-style pottery were recorded. This material clearly derived from the layer below.

Layer 9 (75–135cm bd): This thick layer comprised a silty black (10YR 2/1) sediment with concentrated cobbles and midden materials and represented an *in situ* cultural deposit. The pottery remains were almost exclusively Erueti-style sherds.

Layer 10a (135–160cm bd): The matrix of this layer was identical to the layer above but the ceramics displayed a marked change. Arapus-style sherds only was recovered from this depth (e.g. TP 14, Layer 10 and TP 17, Layer 10).

Layer 8 (160–165cm bd): A thin lens of light gray (10YR 7/1) storm deposited sand was recorded between 160–165cm bd, an indication that the settlement was located near the sea. There was no evidence of any such storm deposited sand in TP 14 or 17, most likely due to their location further inland.

Layer 10b (165–175cm bd): A thin lens of cultural deposit (165–175cm bd) was recorded sandwiched between the sand lens and the former foreshore below. All recovered ceramics were in the Arapus-style.

Layer 11 (175cm bd): The sterile former foreshore comprising primarily water-worn coral cobbles, pebbles and branches was located at this level. There was no sign of any tephra content within the matrix as seen in TP 14, Layer 12.

**TP 14** (11.57m asl) was located on the edge of a terrace, which marks the southern boundary of the site, some 12m above the live coral datum. Recovered cultural material was largely restricted to midden associated with the initial settlement of the area, including Arapus ware pottery.

Layer 1 (0–10cm bd): Layer 1 was a black (10YR 2/1) humic topsoil found across the site which graded into the lower layer with an increasing tephra content.

Layer 2i (10–30cm bd): This layer, a very dark gray (10YR 3/1) matrix, consisted primarily of weathered Kuwae tephra. No midden materials were recovered. Some evidence of gardening activity in the form of pit features were in evidence.
Layer 2iii (30–60cm bd): Remains of the distinctive light brownish gray (10YR 6/2) Kuwae tephra comprised this layer. Again some evidence of gardening activities were recorded. No midden materials were recovered.

Layer 5i (60–100cm bd): This somewhat sterile dark gray (10YR 4/1) developed soil layer was substantially comprised weathered Nguna tephra. The striking difference between this layer and the layer below provided a clear boundary.

Layer 10 (100–160cm bd): This layer represented the concentrated \textit{in situ} cultural deposit which consisted principally of a black (10YR 2/1) silty sediment with concentrated coral and basalt cobbles, and midden materials. Several Erueti-style rims were recovered from the upper level of this layer but from 110cm bd all the pottery consisted solely of Arapus-style sherds (as per TP 4, Layer 10 and TP 17, Layer 10). At the lower level of this layer (140–160cm bd) concentrated large shellfish were encountered along with frequent bone remains. Pottery and the black silt content became increasingly sparse. A large \textit{Trochus niloticus} from this lower level returned a radiocarbon determination of 3010±50 BP (ANU-11160) 2868–2706 BP. Large water worn coral boulders lay at the interface of this layer and the increasingly sterile layer below.

Layer 12 (160–230cm bd): This basal layer consisted of the uplifted former foreshore with a high content of an as yet unidentified tephra. At a depth of 230m the tephra content had completely disappeared (as per TP 4, Layer 11 and TP 17, Layer 11b).

\textit{ST 17} (11.24m asl) was located 25m west of ST 14 and further revealed the nature and extent of the initial settlement site. All recovered ceramics were Arapus-style sherds.

Layer 1 (0–15cm bd): This layer again consisted of black (10YR 2/1) humic topsoil, bereft of midden material.

Layer 6 (15–70cm bd): A greatly increased tephra content characterised this very dark gray (10YR 3/1) developed soil indicating that much of it consisted of weathered tephras. No pure tephra was in evidence. An abrupt change in the matrix marked the appearance of Layer 10. No midden material was in evidence.

Layer 10 (70–120cm bd): Black (10YR 2/1) gritty soil with concentrated midden remains characterised this layer. Frequent basalt and coral cobbles were also recorded. The pottery consisted completely of Arapus-style sherds (as in TP 14, Layer 10 and TP 4, Layer 10). At a depth of 110–130cm bd concentrated large shellfish were again noted in association with frequent bone remains (as per TP 14, Layer 10) coinciding with a decrease in the black soil content and pottery remains.

Layer 11a (120–160cm bd): This layer was primarily made up of concentrated water worn coral cobbles and boulders which seem most likely to represent a natural storm beach deposit (as per TP 14, Layer 10/11 interface). Midden material was sparse and any that was recovered appeared to have filtered down from the layer above. Again a large \textit{Trochus niloticus} was selected for dating from this layer and returned a radiocarbon determination of 3200±50 BP (ANU-11159) 3152–2853 BP.

Layer 11b (160–180cm bd): This level marked the appearance of the former foreshore which in this test pit did not include any tephra content (as in TP 14, Layer 12). This layer was completely bereft of midden remains.