Chapter 2.
Tanamu 1:
A 5000 Year Sequence from Caution Bay

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Introduction

Archaeological sites across Caution Bay often contain distinctive artefactual horizons of varying ages, making it possible to investigate cultural trends at a range of spatial and temporal scales over extended periods of time. Tanamu 1 is a site of particular interest because of its three distinct major occupation horizons that start with the pre-ceramic, followed by Lapita, and end with post-Lapita. The aim of this chapter is to report details of the site, focusing on its chronostratigraphy, so that its various cultural materials (reported in detail in Chapters 3–7) can be examined in context.

Tanamu 1, recorded as site JD6 in the field and allocated the official site code ABHA by the PNG National Museum and Art Gallery, is set in a succession of sub-parallel (coast-to-hinterland) environmental zones. From the coast progressively inland, the Caution Bay catchment contains in succession a Littoral Plains Zone, Alluvial Plains Complex, Coastal Lowland Complex and Hill-Ridge Complex which encompass the Papa, Boroko, Fairfax, Hanuabada and Tovobada land-systems of Mabbutt *et al.* (1965) (as outlined in Aplin *et al.* 2016). Each environmental zone has a distinctive geology, pattern of topography, soils and vegetation. From the mangrove and near-shore thicket, grasslands progressively thin with distance from the coast and as rocky substrates, tree proportions and non-eucalypt patch diversity increase.

Tanamu 1 is positioned above the Littoral Plains Zone where the fore-dunes slope to merge with the alluvial plain. Landform elevations increase around 5km and again at 7.2km inland from the site (corresponding with the Coastal Lowland and Hill-Ridge complexes

Figure 2.1. Tanamu 1 excavation in progress.

Figure 2.2. Mudflats and mangroves to the immediate southwest of Tanamu 1 at low tide.

Figure 2.3. Mudflats and mangroves to the immediate southwest of Tanamu 1 at high tide.

respectively). Tanamu 1 itself is located on the edge of an exposed coastal sand dune forming a low, northwest to southeast-trending peninsula (see Figures 1.1–1.2 for site location map). This grassy peninsula is flanked by the Ruisasi Creek estuary to the east and extensive intertidal mudflats and mangrove forest to the west; collectively the Littoral Plains Zone in the vicinity of Tanamu 1 is up to 800m wide. The site is found 5m above the present high water mark, 25m east of the high tide mark near the inland margins of the mangroves (see Figures 2.1–2.3, showing species of *Avicennia*). While Tanamu 1 is located in *Themeda* grassland, sparse stands of *Acacia*, *Eucalyptus* and *Pandanus* are present nearby.

There are no known Motu or Koita oral traditions about Tanamu 1, and indeed the site was unknown prior to its archaeological discovery in 2008. The site was named by the present authors after the Koita word *tanamu*, meaning 'low hill'. A *tanamu* can be of any shape or sediment type and does not necessarily consist of sand or have a linear form. Tanamu 1 is located 140m SSE of the Bogi 1 archaeological site found along the same coastal sand dune (David *et al.* 2011; McNiven *et al.* 2011). Like Bogi 1, Tanamu 1 exhibits three distinct horizons of dense midden material evidencing focused occupation. The lower level is pre-ceramic, the middle Lapita, and the upper post-Lapita (see below).

Methods

Field Methods

Tanamu 1 was discovered by cultural heritage consultant John Dop, Gau Ario of Papa village and archaeologist

Jeremy Ash during systematic archaeological surveys of the southern parts of the Caution Bay lowlands on 19 January 2008 as part of major development impact studies (David *et al.* 2016b). It was identified as a medium-sized, low density surface scatter of shell, pottery sherds and stone artefacts, 20m × 13m in size, with good potential to contain stratified sub-surface cultural deposits. From 3 December 2009 to 19 March 2010, two contiguous 1m × 1m squares (Squares A and B) were excavated to assess the nature of, and to sample, subsurface cultural deposits (Figures 2.4–2.9). The trench was oriented north-south/east-west and each square independently excavated in arbitrary Excavation Units (XUs) following the stratigraphy. XUs averaged 2.1 ± 0.5cm thick in each of Squares A and B. Field and laboratory methods followed the Caution Bay Project methods unless otherwise stated (see David *et al.* 2016a).

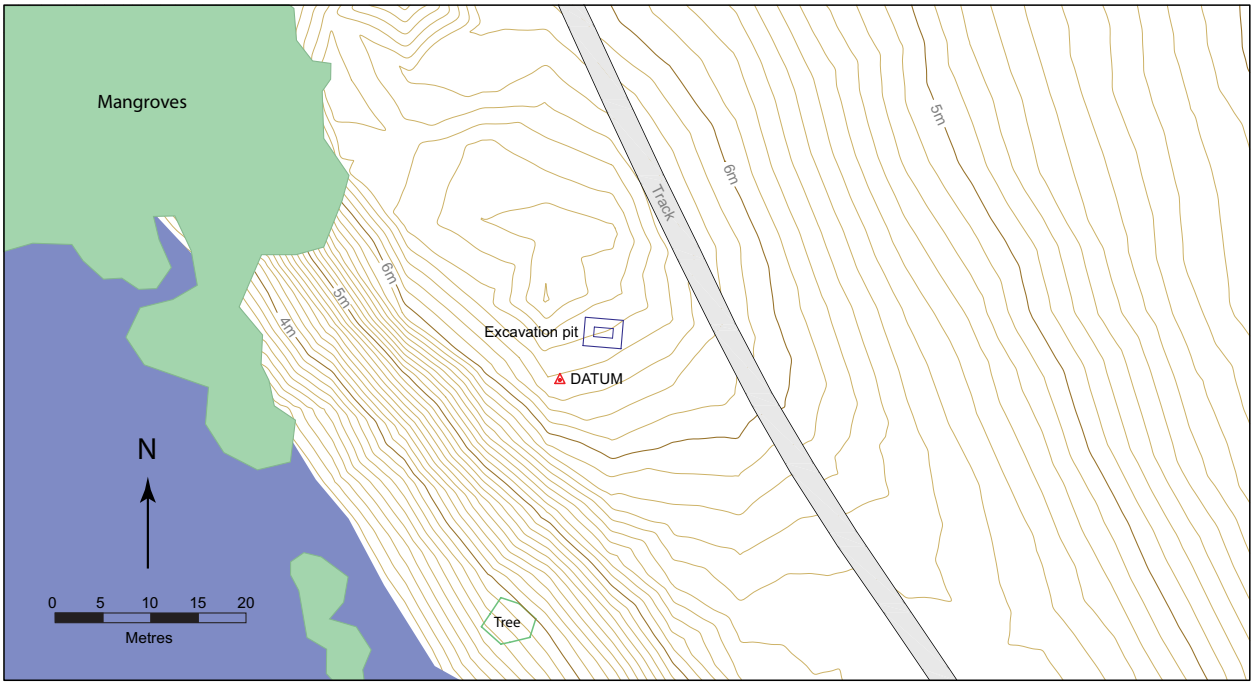

Figure 2.4. Tanamu 1 site map showing location of excavation trench. Contours in 10cm intervals.

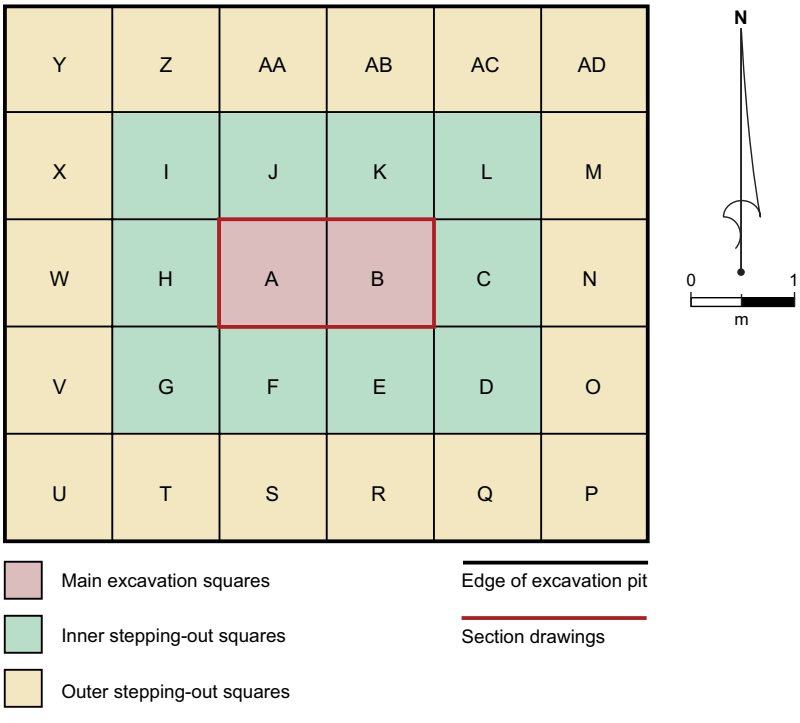

Figure 2.5. Plan of Tanamu 1 trench showing location of each excavation square.

Figure 2.6. Laying out of Tanamu 1 Squares A and B excavation trench showing low density of surface cultural materials.

Figure 2.7. Squares A and B and inner stepping-out squares, early stages of excavation in progress (photograph facing southwest).

Figure 2.8. Details of XUs, Tanamu 1 Square A.

XU	SU	Mean Depth at Top (cm)	Mean Depth at Centre (cm)	Mean Depth at Base (cm)	Mean Thickness (cm)	Weight (kg)	Volume (litres)
1	1	0.0	0.9	1.7	1.7	22.44	22.0
2	1	1.7	2.6	3.5	1.8	22.67	20.0
3	1	3.5	4.6	5.6	2.1	31.63	26.0
4	1	5.6	6.7	7.8	2.2	27.31	22.0
5	1	7.8	8.6	9.4	1.6	28.81	24.5
6	1	9.4	10.6	11.8	2.4	27.87	25.0
7	1	11.8	13.0	14.1	2.3	33.04	28.5
8	1+1a	14.1	15.1	16.0	1.9	30.01	26.5
9	1+1a	16.0	17.0	18.0	2.0	27.88	23.0
10	1+1a+2	18.0	18.9	19.7	1.7	26.05	20.5
11	1+1a+2	19.7	20.7	21.6	1.9	23.71	18.5
12	1+1a+2	21.6	22.9	24.2	2.6	36.89	30.5
13	1+1a+2	24.2	25.0	25.7	1.5	32.38	27.0
14	1+1a+2	25.7	27.4	29.1	3.4	44.41	34.5
15	2	29.1	30.0	30.9	1.8	31.25	22.5
16	2	30.9	32.6	34.2	3.3	39.65	28.5
17	2	34.2	34.3	34.4	0.2	4.80	3.5
18	2	34.4	35.2	36.0	1.6	17.95	13.5
19	2+3	36.0	36.9	37.7	1.7	27.92	20.5
20	2+3	37.7	38.6	39.5	1.8	26.81	19.5
21	2+3	39.5	40.4	41.2	1.7	25.28	18.0
22	2+3	41.2	42.4	43.5	2.3	31.94	22.5
23	2+3	43.5	44.3	45.0	1.5	22.89	18.0
24	2+3	45.0	45.9	46.7	1.7	24.72	20.0
25	2+3	46.7	48.2	49.7	3.0	44.14	37.5
26	2+3	49.7	50.9	52.1	2.4	33.85	24.5
27	2+3	52.1	53.2	54.3	2.2	25.01	19.0
28	3+4	54.3	54.8	55.3	1.0	15.16	11.7[a]
29	3+4	55.3	56.4	57.5	2.2	26.68	17.5
30	3+4	57.5	58.6	59.6	2.1	33.26	23.5
31	3+4	59.6	60.5	61.3	1.7	33.03	15.0
32	3+4	61.3	62.5	63.7	2.4	34.63	23.5
33	3+4	63.7	64.9	66.0	2.3	29.78	21.0
34	3+4	66.0	67.3	68.6	2.6	40.21	28.5
35	3+4	68.6	69.7	70.8	2.2	34.42	27.0
36	3+4	70.8	71.9	73.0	2.2	35.12	34.0
37	3+4	73.0	74.6	76.1	3.1	34.13	26.0
38	3+4	76.1	77.4	78.6	2.5	36.79	26.5
39	3+4	78.6	79.8	81.0	2.4	34.61	25.0
40	4	81.0	81.9	82.7	1.7	29.34	21.0
41	4	82.7	84.4	86.0	3.3	39.70	28.0
42	4+5	86.0	87.6	89.1	3.1	32.28	25.0
43	4+5	89.1	90.3	91.4	2.3	36.91	26.0
44	4+5	91.4	92.7	94.0	2.6	31.40	22.0
45	4+5	94.0	95.3	96.5	2.5	34.86	25.0
46	4+5	96.5	97.6	98.7	2.2	35.00	26.0

XU	SU	Mean Depth at Top (cm)	Mean Depth at Centre (cm)	Mean Depth at Base (cm)	Mean Thickness (cm)	Weight (kg)	Volume (litres)
47	4+5	98.7	99.8	100.9	2.2	29.55	25.0
48	4+5	100.9	103.0	105.0	4.1	47.10	36.5
49	4+5	105.0	106.0	106.9	1.9	28.78	22.0
50	4+5	106.9	108.0	109.1	2.2	21.63	22.5
51	4+5	109.1	110.0	110.8	1.7	21.37	15.5
52	4+5	110.8	111.7	112.5	1.7	34.25	25.5
53	4+5	112.5	113.8	115.0	2.5	35.35	26.5
54	4+5	115.0	115.8	116.5	1.5	22.68	8.0
55	4+5	116.5	117.6	118.7	2.2	31.41	24.0
56	4+5	118.7	119.6	120.4	1.7	32.44	26.0
57	5	120.4	121.7	123.0	2.6	30.01	21.5
58	5	123.0	124.1	125.2	2.2	31.65	27.0
59	5	125.2	126.4	127.6	2.4	37.24	27.0
60	5	127.6	128.5	129.4	1.8	21.21	17.5
61	5	129.4	130.8	131.7	2.3	34.97	26.5
62	5	131.7	132.9	134.1	2.4	34.47	25.0
63	5	134.1	135.2	136.3	2.2	32.38	25.5
64	5+6	136.3	137.8	139.2	2.9	34.67	25.0
65	5+6	139.2	140.2	141.1	1.9	29.02	26.0
66	5+6	141.1	142.8	144.4	3.3	46.42	30.0
67	5+6	144.4	145.3	146.2	1.8	31.66	25.5
68	5+6	146.2	146.7	147.2	1.0	7.47	7.0
69	5+6	147.2	147.9	148.6	1.4	22.94	17.0
70	5+6	148.6	149.5	150.4	1.8	23.00	18.5
71	6	150.4	151.0	151.5	1.1	17.24	12.5
72	6	151.5	152.5	153.5	2.0	23.70	16.5
73	6	153.5	154.7	155.8	2.3	19.66	23.5
74	6	155.8	156.6	157.3	1.5	22.90	17.6[a]
75	6	157.3	158.5	159.7	2.4	39.90	32.5
76	6	159.7	160.6	161.5	1.8	27.53	20.5
77	6	161.5	162.4	163.3	1.8	26.76	23.5
78	6	163.3	164.3	165.2	1.9	33.64	27.0
79	6	165.2	166.1	167.0	1.8	28.83	23.0
80	6	167.0	168.2	169.3	2.3	34.27	26.0
81	6	169.3	170.5	171.6	2.3	29.42	25.5
82	6	171.6	172.6	173.5	1.9	33.21	27.0
83	6	173.5	174.6	175.6	2.1	29.42	25.5
84	6	175.6	176.5	177.3	1.7	29.36	30.5
85	6	177.3	178.4	179.5	2.2	33.47	23.0
86	6	179.5	180.3	181.0	1.5	26.44	22.0
87	6	181.0	182.2	183.3	2.3	40.35	29.0
88	6	183.3	184.3	185.3	2.0	30.76	25.0
89	6	185.3	186.6	187.9	2.6	40.38	31.0
90	6	187.9	188.9	189.8	1.9	29.80	24.5
91	6	189.8	191.0	192.1	2.3	41.13	32.5
92	6	192.1	193.1	194.1	2.0	33.34	25.0
93	6	194.1	195.3	196.5	2.4	37.73	31.0

XU	SU	Mean Depth at Top (cm)	Mean Depth at Centre (cm)	Mean Depth at Base (cm)	Mean Thickness (cm)	Weight (kg)	Volume (litres)
94	6	196.5	197.1	197.7	1.2	18.20[a]	14.0
95	6	197.7	198.5	199.3	1.6	13.25	10.5
96	6	199.3	200.4	201.5	2.2	41.90	35.0
97	6	201.5	202.4	203.3	1.8	25.72	20.5
98	6	203.3	204.4	205.5	2.2	34.87	28.0
99	6	205.5	206.4	207.2	1.7	32.60	26.5
100	6	207.2	208.2	209.2	2.0	29.69	16.5
101	6	209.2	210.3	211.4	2.2	37.50	23.5
102	6	211.4	212.4	213.4	2.0	31.85	25.0
103	6	213.4	214.6	215.8	2.4	30.19	24.0
104	6+7	215.8	216.9	217.9	2.1	37.37	27.0
105	6+7	217.9	219.1	219.3	1.4	28.42	21.0
106	6+7	219.3	220.2	221.1	1.8	29.63	23.0
107	6+7	221.1	222.4	223.7	2.6	40.30	29.0
108	6+7	223.7	224.6	225.5	1.8	26.14	17.0
109	6+7	225.5	226.4	227.3	1.8	26.77	20.0
110	6+7	227.3	228.3	229.3	2.0	32.06	23.0
111	6+7	229.3	230.3	231.2	1.9	29.49	23.5
112	6+7	231.2	232.1	233.0	1.8	34.69	26.0
113	6+7	233.0	234.1	235.1	2.1	30.18	27.0
114	6+7	235.1	236.2	237.3	2.2	32.44	25.5
115	6+7	237.3	238.3	239.2	1.9	34.49	25.5
116	7	239.2	240.5	241.8	2.6	32.67	26.0
117	7	241.8	242.6	243.4	1.6	32.13	25.0
118	7	243.4	244.5	245.6	2.2	32.56	26.0
119	7	245.6	246.8	248.0	2.4	34.34	27.0
120	7	248.0	249.0	249.9	1.9	33.98	25.5
121	7	249.9	250.9	251.9	2.0	34.32	26.5
122	7	251.9	253.2	254.4	2.5	38.08	28.5
123	7	254.4	255.5	256.5	2.1	34.59	25.0
124	7	256.5	257.5	258.4	1.9	31.14	25.0
125	7	258.4	258.6	258.8	0.4	14.41	11.0
126	7	258.8	260.0	261.2	2.4	33.32	26.0
127	7	261.2	262.4	263.5	2.3	33.32	27.0
128	7	263.5	264.9	266.2	2.7	44.10	33.5
129	7	266.2	267.8	269.3	3.1	45.33	33.5
130	7	269.3	270.6	271.8	2.5	42.08	31.5
131	7	271.8	273.4	274.9	3.1	49.54	39.0
132	7	274.9	276.4	277.9	3.0	36.86	32.5
133	7	277.9	278.9	279.9	2.0	32.08	21.5
134	7	279.9	281.0	282.1	2.2	27.34	29.5
Total					2.1	4,169.47	3,223.3

[a] Original values were missing from the excavation records and are here estimated from average weight-volume ratios for the square as a whole.

Figure 2.9. Details of XUs, Tanamu 1 Square B.

XU	SU	Mean Depth at Top (cm)	Mean Depth at Centre (cm)	Mean Depth at Base (cm)	Mean Thickness (cm)	Weight (kg)	Volume (litres)	pH	Organic matter (% weight)	Particles >1000 µm (% weight)	Particle size distribution of particles <1000 µm (% volume)					
											sand (1000–63 µm)	*coarse sand (1000–600 µm)*	*medium sand (600–212 µm)*	*fine sand (212–63 µm)*	silt (63–2 µm)	clay (<2 µm)
1	1	0.0	1.0	1.9	1.9	17.20	16.5	Not available								
2	1	1.9	2.5	3.1	1.2	17.45	18.0									
3	1	3.1	4.3	5.4	2.3	35.97	24.0									
4	1	5.4	6.3	7.2	1.8	27.17	23.0	6.51	3.40	0.3	92.5	*0.4*	*28.8*	*63.3*	4.5	3.0
5	1	7.2	8.2	9.2	2.0	62.15	30.0	6.60	4.38	1.5	88.6	*0.1*	*28.0*	*60.5*	8.4	3.0
6	1	9.2	10.2	11.2	2.0		27.0	Not available								
7	1	11.2	12.6	13.9	2.7	36.68	38.0									
8	1	13.9	15.0	16.0	2.1	37.66	34.0									
9	1	16.0	17.0	17.9	1.9	23.31	25.0									
10	1+2	17.9	18.8	19.7	1.8	27.53	23.5									
11	1+2	19.7	20.6	21.5	1.8	23.24	19.5									
12	1+2	21.5	22.6	23.7	2.2	29.62	27.0	6.44	2.02	0.5	91.9	*0.4*	*29.0*	*62.5*	6.2	1.9
13	1+2	23.7	24.5	25.3	1.6	27.83	26.0	Not available								
14	1+2	25.3	26.6	27.9	2.6	33.33	26.0									
15	2	27.9	29.1	30.3	2.4	31.59	25.0									
16	2	30.3	31.7	33.1	2.8	41.71	30.0									
17	2	33.1	33.6	34.1	1.0	17.98	12.0									
18	2	34.1	35.0	35.8	1.7	23.02	16.5	6.45	1.66	0.4	91.5	*0.3*	*26.6*	*64.6*	6.6	1.9
19	2	35.8	36.8	37.8	2.0	28.10	20.0	6.32	1.73	0.3	91.6	*0.4*	*27.0*	*64.2*	6.7	1.7
20	2	37.8	38.8	39.7	1.9	25.42	18.5	Not available								
21	2	39.7	40.7	41.6	1.9	26.06	19.5	6.42	1.63	0.5	92.5	*1.7*	*28.9*	*61.9*	6.3	1.2
22	2+3	41.6	42.6	43.6	2.0	27.72	20.0	6.35	1.69	0.8	90.0	*0.1*	*25.9*	*64.0*	7.9	2.1
23	2+3	43.6	44.5	45.3	1.7	27.73	22.0	Not available								
24	2+3	45.3	46.3	47.3	2.0	28.13	20.0	6.88	1.78	1.9	88.4	*0.1*	*25.1*	*63.2*	9.8	1.8

XU	SU	Mean Depth at Top (cm)	Mean Depth at Centre (cm)	Mean Depth at Base (cm)	Mean Thickness (cm)	Weight (kg)	Volume (litres)	pH	Organic matter (% weight)	Particles >1000 µm (% weight)	Particle size distribution of particles <1000 µm (% volume)					
											sand (1000–63 µm)	*coarse sand (1000–600 µm)*	*medium sand (600–212 µm)*	*fine sand (212–63 µm)*	silt (63–2 µm)	clay (<2 µm)
25	2+3	47.3	48.6	49.9	2.6	35.92	26.0	Not available								
26	2+3	49.9	50.8	51.7	1.8	21.01	18.0									
27	2+3	51.7	52.7	53.6	1.9	29.90	21.5									
28	2+3+4	53.6	54.5	55.3	1.7	28.94	21.0									
29	2+3+4	55.3	56.4	57.5	2.2	31.49	22.0									
30	2+3+4	57.5	59.0	60.4	2.9	45.28	31.5	7.27	1.66	1.1	91.4	*0.4*	*28.1*	*62.9*	7.2	1.4
31	3+4	60.4	61.2	62.0	1.6	9.52	14.5	7.31	1.59	3.0	90.6	*0.9*	*28.6*	*61.1*	7.9	1.5
32	3+4	62.0	63.4	64.8	2.8	34.57	23.5	7.42	1.50	6.3	82.0	*0.0*	*24.4*	*57.6*	15.4	2.6
33	3+4	64.8	65.8	66.8	2.0	30.82	24.0	Not available								
34	3+4	66.8	68.2	69.6	2.8	45.65	32.0	7.44	1.49	1.3	91.5	*1.7*	*28.1*	*61.7*	6.5	2.0
35	3+4	69.6	70.9	72.1	2.5	29.51	21.0	Not available								
36	3+4	72.1	72.9	73.7	1.6	33.46	24.0									
37	3+4	73.7	74.8	75.9	2.2	30.49	22.0	7.65	1.32	1.7	91.6	*2.4*	*28.2*	*61.0*	6.4	2.0
38	3+4	75.9	77.4	78.8	2.9	41.38	29.0	Not available								
39	3+4	78.8	79.0	81.1	2.3	33.74	25.0									
40	4	81.1	82.3	83.4	2.3	35.80	26.5	7.73	1.26	1.7	91.9	*0.4*	*27.2*	*64.3*	6.1	2.0
41	4	83.4	84.6	85.8	2.4	37.09	27.0	7.67	2.37	1.2	92.9	*1.4*	*28.3*	*63.2*	5.3	1.8
42	4	85.8	86.8	87.7	1.9	28.86	20.0	7.78	1.24	1.5	91.5	*0.5*	*26.5*	*64.5*	6.3	2.2
43	4	87.7	89.0	90.3	2.6	32.15	24.0	7.89	1.24	1.8	91.3	*0.0*	*26.9*	*64.4*	6.6	2.1
44	4	90.3	91.7	93.0	2.7	38.67	29.5	7.83	1.32	1.4	90.5	*0.0*	*24.0*	*66.5*	7.3	2.2
45	4+5	93.0	94.2	95.4	2.4	40.53	30.0	7.86	1.32	2.0	87.3	*0.0*	*18.7*	*68.6*	10.0	2.7
46	4+5	95.4	96.4	97.3	1.9	27.73	22.0	7.92	1.42	3.6	90.3	*0.7*	*26.5*	*63.1*	7.3	2.4
47	4+5	97.3	98.6	99.8	2.5	36.68	27.0	7.77	1.58	1.5	90.4	*0.1*	*25.5*	*64.8*	7.2	2.4
48	4+5	99.8	101.2	102.5	2.7	37.95	27.0	Not available								
49	4+5	102.5	103.6	104.7	2.2	38.98	29.0									
50	4+5	104.7	105.9	107.0	2.3	42.07	24.0	7.84	1.93	2.4	87.7	*0.1*	*27.2*	*60.4*	9.1	3.2
51	4+5	107.0	107.9	108.7	1.7	23.09	18.0	7.87	2.62	4.6	83.7	*0.0*	*21.9*	*61.8*	12.2	4.1
52	4+5	108.7	109.6	110.4	1.7	26.27	19.5	Not available								
53	5	110.4	111.4	112.3	1.9	16.92	21.0	7.85	2.32	1.0	83.7	*0.0*	*26.4*	*57.3*	11.9	4.4

XU	SU	Mean Depth at Top (cm)	Mean Depth at Centre (cm)	Mean Depth at Base (cm)	Mean Thickness (cm)	Weight (kg)	Volume (litres)	pH	Organic matter (% weight)	Particles >1000 µm (% weight)	Particle size distribution of particles <1000 µm (% volume)					
											sand (1000–63 µm)	*coarse sand (1000–600 µm)*	*medium sand (600–212 µm)*	*fine sand (212–63 µm)*	silt (63–2 µm)	clay (<2 µm)
54	5	112.3	113.1	113.9	1.6	31.43	16.0	7.83	1.85	2.8	84.3	*0.0*	*26.5*	*57.8*	11.5	4.2
55	5	113.9	114.8	115.7	1.8	29.44	25.0	7.83	2.55	5.8	83.5	*0.0*	*29.3*	*54.2*	12.5	4.0
56	5	115.7	116.5	117.2	1.5	21.43	16.5	7.84	2.43	2.6	79.2	*0.0*	*23.3*	*55.9*	15.2	5.6
57	5	117.2	118.4	119.6	2.4	31.01	22.0	7.85	2.57	2.4	82.4	*0.1*	*27.1*	*55.2*	12.7	4.9
58	5	119.6	120.7	121.8	2.2	32.06	26.0	7.86	2.51	3.6	80.9	*0.0*	*19.7*	*61.2*	13.8	5.3
59	5	121.8	122.9	123.9	2.1	29.80	22.5	Not available								
60	5	123.9	124.7	125.4	1.5	24.61	19.5	7.98	2.11	3.7	81.8	*0.0*	*24.8*	*57.0*	13.3	4.9
61	5	125.4	126.6	127.7	2.3	32.17	23.5	8.00	2.03	1.8	80.2	*0.0*	*23.3*	*56.9*	13.4	6.4
62	5	127.7	129.0	130.3	2.6	23.53	26.0	7.98	1.97	2.8	85.3	*0.0*	*28.9*	*56.4*	10.1	4.6
63	5	130.3	131.6	132.8	2.5	31.69	23.5	7.97	1.89	4.5	83.0	*0.0*	*22.7*	*60.3*	12.5	4.5
64	5	132.8	134.1	135.3	2.5	34.50	28.0	8.00	1.60	10.6	88.2	*0.2*	*31.0*	*57.0*	8.4	3.4
65	5	135.3	136.3	137.3	2.0	33.90	26.0	8.10	1.50	1.4	89.3	*1.1*	*32.4*	*55.8*	8.0	2.7
66	5	137.3	138.9	140.5	3.2	48.53	33.5	8.10	1.43	1.6	89.5	*1.4*	*33.3*	*54.8*	7.8	2.7
67	5	140.5	141.9	143.2	2.7	44.74	31.0	8.04	1.33	3.5	85.3	*0.3*	*28.2*	*56.8*	11.0	3.7
68	5+6	143.2	143.6	144.0	0.8	10.99	9.0	8.09	1.25	3.0	89.8	*0.2*	*31.1*	*58.5*	7.6	2.6
69	5+6	144.0	145.2	146.3	2.3	22.49	17.0	8.19	1.11	0.9	84.3	*0.0*	*28.4*	*55.9*	12.1	3.6
70	5+6	146.3	146.8	147.3	1.0	27.59	23.5	8.23	0.94	0.4	89.3	*0.0*	*27.5*	*61.8*	8.0	2.7
71	5+6	147.3	148.2	149.1	1.8	25.34	19.0	8.29	0.90	1.9	93.3	*0.5*	*33.9*	*58.9*	4.9	1.8
72	5+6	149.1	150.3	151.4	2.3	30.35	25.0	8.32	0.94	0.2	91.7	*0.1*	*30.1*	*61.5*	6.2	2.1
73	5+6	151.4	152.2	152.9	1.5	27.80	19.5	8.30	0.97	0.3	84.0	*0.0*	*20.9*	*63.1*	13.5	2.5
74	5+6	152.9	154.1	155.2	2.3	33.94	26.5[a]	8.30	0.98	0.3	93.2	*0.7*	*32.1*	*60.4*	5.1	1.7
75	6	155.2	155.8	156.8	1.6	25.42	22.0	8.33	0.91	3.4	85.8	*0.2*	*28.6*	*57.0*	12.3	1.9
76	6	156.8	157.8	158.7	1.9	36.78	27.0	8.40	0.82	0.9	92.8	*0.4*	*32.2*	*60.2*	5.9	1.3
77	6	158.7	159.6	160.4	1.7	16.22	13.5	8.42	0.82	0.3	94.6	*1.0*	*34.7*	*58.9*	4.0	1.4
78	6	160.4	161.2	162.0	1.6	24.48	21.0	8.42	0.89	1.6	90.3	*0.1*	*24.3*	*65.9*	7.9	1.8
79	6	162.0	163.1	164.2	2.2	38.08	32.0	8.43	0.90	0.2	92.9	*1.5*	*33.7*	*57.7*	5.9	1.2
80	6	164.2	165.2	166.2	2.0	27.87	24.5	8.42	0.88	0.5	93.4	*1.6*	*35.2*	*56.6*	5.4	1.2
81	6	166.2	167.3	168.3	2.1	30.47	25.5	8.43	0.90	0.6	94.0	*1.4*	*33.6*	*59.0*	4.6	1.4
82	6	168.3	169.5	170.7	2.4	38.07	32.5	8.36	0.88	0.2	88.9	*0.3*	*29.4*	*59.2*	9.3	1.8

XU	SU	Mean Depth at Top (cm)	Mean Depth at Centre (cm)	Mean Depth at Base (cm)	Mean Thickness (cm)	Weight (kg)	Volume (litres)	pH	Organic matter (% weight)	Particles >1000 µm (% weight)	Particle size distribution of particles <1000 µm (% volume)					
											sand (1000–63 µm)	*coarse sand (1000–600 µm)*	*medium sand (600–212 µm)*	*fine sand (212–63 µm)*	silt (63–2 µm)	clay (<2 µm)
83	6	170.7	171.8	172.8	2.1	30.77	26.0	8.31	0.90	0.7	91.9	*0.5*	*32.1*	*59.3*	6.4	1.7
84	6	172.8	173.9	175.0	2.2	32.23	25.0	8.40	0.89	0.2	89.5	*0.4*	*33.2*	*55.9*	8.6	1.9
85	6	175.0	175.9	176.8	1.8	27.60	23.0	8.38	1.10	0.6	90.0	*0.5*	*34.2*	*55.3*	8.1	1.9
86	6	176.8	177.8	178.7	1.9	32.84	24.5	8.48	0.84	0.8	94.7	*1.6*	*36.4*	*56.7*	3.9	1.4
87	6	178.7	179.9	180.9	2.2	34.18	27.5	8.48	0.83	0.5	91.2	*0.4*	*32.1*	*58.7*	7.2	1.6
88	6	180.9	182.0	183.1	2.2	30.22	25.0	8.54	0.88	0.7	94.5	*0.8*	*37.3*	*56.4*	4.3	1.2
89	6	183.1	184.3	185.4	2.3	39.93	34.0	8.50	0.91	1.3	94.3	*0.7*	*35.5*	*58.1*	4.3	1.4
90	6	185.4	186.6	187.7	2.3	31.15	25.0	8.56	0.93	0.3	94.6	*0.4*	*34.8*	*59.4*	4.1	1.3
91	6	187.7	189.0	190.2	2.5	38.18	32.0	8.52	0.93	0.9	91.6	*1.4*	*37.3*	*52.9*	6.9	1.5
92	6	190.2	191.2	192.2	2.0	33.49	26.5	8.54	1.04	1.0	91.6	*2.5*	*38.6*	*50.5*	7.0	1.4
93	6	192.2	193.4	194.6	2.4	34.63	27.5	8.57	0.95	1.6	93.4	*3.4*	*44.2*	*45.8*	5.4	1.2
94	6	194.6	195.2	195.7	1.1	14.86	12.5	8.60	0.82	3.0	88.8	*1.7*	*39.6*	*47.5*	9.5	1.7
95	6	195.7	196.6	197.4	1.7	19.99	15.5	8.60	0.83	6.4	90.0	*2.5*	*38.6*	*48.9*	8.1	1.9
96	6	197.4	198.3	199.2	1.8	23.86	18.0	8.64	0.73	0.5	88.9	*0.6*	*40.0*	*48.3*	9.3	1.8
97	6	199.2	200.1	200.9	1.7	33.63	25.5	8.65	0.98	5.2	94.4	*4.2*	*46.6*	*43.6*	4.4	1.2
98	6	200.9	201.9	202.9	2.0	35.17	30.0	8.59	0.88	0.4	94.4	*3.4*	*44.2*	*46.8*	4.5	1.1
99	6	202.9	203.8	204.7	1.8	32.65	20.5	8.61	0.91	1.0	94.1	*2.7*	*40.9*	*50.5*	4.6	1.3
100	6	204.7	205.6	206.4	1.7	22.50	26.0	8.57	0.74	1.0	94.5	*3.1*	*42.9*	*48.5*	4.3	1.2
101	6	206.4	207.6	208.8	2.4	29.68	24.5	8.60	0.72	0.9	95.0	*3.5*	*42.4*	*49.1*	3.8	1.2
102	6	208.8	209.7	210.6	1.8	27.60	22.5	8.63	0.73	3.0	95.4	*3.9*	*46.2*	*45.3*	3.5	1.1
103	6	210.6	211.9	213.1	2.5	35.69	29.0	8.61	0.80	1.6	96.3	*4.3*	*47.0*	*45.0*	2.8	0.9
104	6	213.1	213.8	214.5	1.4	22.56	18.0	8.63	0.78	1.8	93.2	*3.7*	*43.1*	*46.4*	5.6	1.2
105	6	214.5	215.6	216.6	2.1	33.61	28.0	8.63	0.80	1.9	92.0	*2.4*	*39.9*	*49.7*	6.4	1.6
106	6	216.6	217.3	218.0	1.4	23.95	20.0	8.62	0.81	4.9	95.1	*3.1*	*48.6*	*43.4*	3.7	1.2
107	6	218.0	219.0	220.0	2.0	32.48	26.5	8.62	0.91	2.8	78.3	*0.0*	*19.5*	*58.8*	18.9	2.8
108	6	220.0	220.9	221.7	1.7	22.00	16.5	8.67	0.92	3.1	88.9	*0.6*	*40.0*	*48.3*	9.3	1.8
109	6+7	221.7	222.6	223.5	1.8	29.52	22.5	8.55	0.87	2.7	95.5	*3.5*	*49.9*	*42.1*	3.3	1.2
110	6+7	223.5	224.6	225.7	2.2	27.85	21.5	8.57	0.91	0.9	96.0	*4.3*	*48.8*	*42.9*	2.9	1.1
111	6+7	225.7	227.0	228.2	2.5	34.84	28.0	8.63	0.96	2.0	95.9	*3.7*	*54.4*	*37.8*	3.0	1.1

XU	SU	Mean Depth at Top (cm)	Mean Depth at Centre (cm)	Mean Depth at Base (cm)	Mean Thickness (cm)	Weight (kg)	Volume (litres)	pH	Organic matter (% weight)	Particles >1000 µm (% weight)	Particle size distribution of particles <1000 µm (% volume)					
											sand (1000–63 µm)	*coarse sand (1000–600 µm)*	*medium sand (600–212 µm)*	*fine sand (212–63 µm)*	silt (63–2 µm)	clay (<2 µm)
112	6+7	228.2	229.0	229.7	1.5	22.43	18.0	8.64	0.93	1.9	95.0	*3.2*	*49.8*	*42.0*	3.7	1.3
113	6+7	229.7	231.0	232.3	2.6	40.58	29.0	8.66	0.94	1.7	94.7	*3.5*	*52.0*	*39.2*	4.0	1.3
114	6+7	232.3	233.3	234.2	1.9	27.59	21.0	8.65	0.92	4.3	95.5	*4.5*	*54.8*	*36.2*	3.4	1.1
115	6+7	234.2	235.1	236.0	1.8	34.12	27.5	8.65	0.97	3.1	95.6	*4.0*	*55.5*	*36.1*	3.3	1.1
116	6+7	236.0	237.3	238.6	2.6	23.80	26.0	8.69	0.97	6.2	95.8	*3.6*	*57.6*	*34.6*	3.2	1.0
117	6+7	238.6	239.5	240.3	1.7	33.29	24.0	8.71	0.95	3.8	96.1	*4.5*	*56.2*	*35.4*	2.9	1.0
118	7	240.3	241.5	242.6	2.3	31.06	24.5	8.69	0.97	3.7	92.5	*3.9*	*51.1*	*37.5*	5.9	1.6
119	7	242.6	243.9	245.2	2.6	36.47	27.0	8.53	1.00	6.0	95.8	*5.2*	*56.3*	*34.3*	3.1	1.1
120	7	245.2	246.2	247.1	1.9	32.02	25.0	3.60	1.00	2.6	94.7	*3.7*	*54.5*	*36.5*	3.9	1.4
121	7	247.1	248.3	249.4	2.3	32.04	25.0	8.61	0.99	4.0	95.6	*5.2*	*55.5*	*34.9*	3.3	1.1
122	7	249.4	250.4	251.4	2.0	33.13	25.0	8.61	0.96	11.3	94.3	*6.4*	*54.2*	*33.7*	4.2	1.5
123	7	251.4	252.3	253.1	1.7	27.22	20.5	8.68	0.99	4.5	94.8	*7.4*	*52.2*	*35.2*	3.8	1.4
124	7	253.1	254.1	255.0	1.9	26.15	20.0	8.65	0.89	1.0	95.2	*7.2*	*54.7*	*33.3*	3.6	1.2
125	7	255.0	255.6	256.2	1.2	21.06	16.0	8.65	0.91	3.3	94.8	*5.6*	*51.0*	*38.2*	3.8	1.4
126	7	256.2	257.1	258.0	1.8	31.25	25.5	8.65	0.94	2.5	97.2	*9.5*	*54.1*	*33.6*	2.1	0.7
127	7	258.0	259.4	260.7	2.7	34.46	26.5	8.66	0.88	2.3	94.3	*9.3*	*51.4*	*33.6*	4.3	1.4
128	7	260.7	262.2	263.7	3.0	43.52	36.0	8.67	0.80	3.6	92.5	*5.2*	*46.2*	*41.1*	5.9	1.6
129	7	263.7	265.2	266.6	2.9	48.96	36.5	8.70	0.71	4.1	94.5	*14.5*	*45.0*	*35.0*	4.4	1.1
130	7	266.6	268.1	269.6	3.0	40.53	33.5	7.67	0.76	2.2	94.9	*14.5*	*45.8*	*34.6*	4.1	1.0
131	7	269.6	271.4	273.1	3.5	51.10	41.0	8.70	0.78	2.9	94.9	*14.9*	*45.2*	*34.8*	4.0	1.1
132	7	273.1	274.3	275.5	2.4	30.19	30.0	8.69	0.75	5.6	93.4	*12.1*	*41.7*	*39.6*	5.4	1.2
133	7	275.5	276.6	277.7	2.2	36.31	29.5	8.72	0.68	3.6	93.9	*10.9*	*42.7*	*40.3*	5.0	1.1
134	7	277.7	278.9	280.1	2.4	45.97	36.0	8.69	0.89	5.7	94.0	*9.8*	*42.7*	*41.5*	5.0	1.0
Total					2.1	4,136.71	3,261.0									

[a] Original values were missing from the excavation records and are here estimated from average weight-volume ratios for the square as a whole.

Figure 2.10. Excavation of the outer stepping-out squares in progress, Tanamu 1.

Construction-related safety protocols required the excavation and shoring of stepping-out squares to allow vertical excavation of Squares A and B to continue deeper than 1.20m (David *et al.* 2016a), so a double-ring of additional 1m × 1m squares totaling 28 squares was excavated around Squares A and B (Figures 2.7, 2.10–2.12). The inner stepping-out ring, Squares C–L, was dug to a maximum 2.15m depth in 21 XUs per square at a mean 9.9 ± 1.1cm thickness per XU. The top 50cm (XU1) of the outer ring, Squares M–Z and AA–AD, were removed by shovel prior to excavating each square with trowel to a maximum 1.03m depth in four further XUs of average 12.1 ± 4.3cm thickness per square (Figure 2.14; see Figure 2.13 for depth of each square). Prior to the stepping-out process, the Squares A and B wall profiles were photographed and drawn. Because of salvage time restrictions and imminent construction developments, the stepping-out squares were expediently excavated without sieving and with only the observed decorated ceramics and selected artefacts plotted and collected as detailed in David *et al.* (2016a).

Figure 2.11. Removing shoring after excavation of the outer ring of excavation squares, Tanamu 1. The central trench (Squares A and B, bottom-right of photo) is covered by a wooden lid.

Figure 2.12. Re-stringing Squares A and B to continue excavation after removal of shoring of the outer stepping-out squares, Tanamu 1.

Figure 2.13. Details of XUs, Tanamu 1 stepping-out squares. Elevations were taken with automatic levels to 1mm precision, except for XU1 of the outer ring Squares M–AD which were calculated by tape measure.

XU	SU	Mean Depth at Top (cm)	Mean Depth at Centre (cm)	Mean Depth at Base (cm)	Mean Thickness (cm)
Square C					
1	1	0	4.9	9.8	9.8
2	1	9.8	15.0	20.2	10.4
3	1+2	20.2	25.1	30.0	9.8
4	2+3	30.0	35.1	40.1	10.1
5	2+3	40.1	44.6	49.1	9.0
6	2+3+4	49.1	54.0	58.8	9.7
7	3+4	58.8	64.2	69.5	10.7
8	3+4	69.5	74.1	78.6	9.1
9	4	78.6	83.7	88.7	10.1
10	4+5	88.7	93.7	98.7	10.0
11	4+5	98.7	103.2	107.7	9.0
12	4+5	107.7	112.8	117.9	10.2
13	5	117.9	123.0	128.0	10.1
14	5	128.0	134.1	140.2	12.2
15	5+6	140.2	143.4	146.5	6.3
16	5+6	146.5	151.1	155.7	9.2
17	6	155.7	161.0	166.2	10.5
18	6	166.2	171.4	176.6	10.4

XU	SU	Mean Depth at Top (cm)	Mean Depth at Centre (cm)	Mean Depth at Base (cm)	Mean Thickness (cm)
19	6	176.6	181.6	186.6	10.0
20	6	186.6	192.2	197.7	11.1
21	6	197.7	200.9	204.1	6.4
Square D					
1	1	0	7.2	14.4	14.4
2	1	14.4	19.2	24.0	9.6
3	1+2	24.0	29.0	34.0	10.0
4	2+3	34.0	38.4	42.8	8.8
5	2+3	42.8	48.2	53.6	10.8
6	2+3+4	53.6	56.9	60.1	6.5
7	3+4	60.1	64.4	68.6	8.5
8	3+4	68.6	74.1	79.6	11.0
9	4	79.6	83.4	87.1	7.5
10	4+5	87.1	93.1	99.1	12.0
11	4+5	99.1	103.8	108.5	9.4
12	4+5	108.5	113.0	117.4	8.9
13	5	117.4	122.6	127.7	10.3
14	5	127.7	132.5	137.3	9.6
15	5+6	137.3	142.3	147.2	9.9
16	5+6	147.2	151.5	155.7	8.5
17	6	155.7	161.1	166.5	10.8
18	6	166.5	171.4	176.3	9.8
19	6	176.3	181.8	187.2	10.9
20	6	187.2	192.6	197.9	10.7
21	6	197.9	201.9	205.9	8.0
Square E					
1	1	0	4.4	8.8	8.8
2	1	8.8	13.9	18.9	10.1
3	1+2	18.9	24.5	30.0	11.1
4	2+3	30.0	34.7	39.4	9.4
5	2+3	39.4	44.5	49.5	10.1
6	2+3+4	49.5	54.6	59.6	10.1
7	3+4	59.6	64.4	69.2	9.6
8	3+4	69.2	73.3	77.4	8.2
9	4	77.4	81.9	86.4	9.0
10	4+5	86.4	91.6	96.8	10.4
11	4+5	96.8	101.7	106.6	9.8
12	4+5	106.6	111.6	116.5	9.9
13	5	116.5	122.1	127.7	11.2
14	5	127.7	131.7	135.6	7.9
15	5+6	135.6	140.3	144.9	9.3
16	5+6	144.9	149.7	154.5	9.6
17	6	154.5	160.0	165.5	11.0
18	6	165.5	170.9	176.2	10.7
19	6	176.2	180.6	184.9	8.7
20	6	184.9	189.8	194.6	9.7
21	6	194.6	199.7	204.7	10.1

XU	SU	Mean Depth at Top (cm)	Mean Depth at Centre (cm)	Mean Depth at Base (cm)	Mean Thickness (cm)
Square F					
1	1	0	5.0	9.9	9.9
2	1	9.9	15.0	20.1	10.2
3	1+2	20.1	25.2	30.2	10.1
4	2+3	30.2	34.8	39.4	9.2
5	2+3	39.4	43.9	48.4	9.0
6	2+3+4	48.4	52.8	57.1	8.7
7	3+4	57.1	62.1	67.0	9.9
8	3+4	67.0	73.5	79.9	12.9
9	4	79.9	84.4	88.9	9.0
10	4+5	88.9	93.6	98.3	9.4
11	4+5	98.3	103.9	109.5	11.2
12	4+5	109.5	114.5	119.5	10.0
13	5	119.5	124.7	129.9	10.4
14	5	129.9	134.6	139.3	9.4
15	5+6	139.3	144.2	149.1	9.8
16	5+6	149.1	153.9	158.6	9.5
17	6	158.6	163.3	167.9	9.3
18	6	167.9	173.8	179.7	11.8
19	6	179.7	184.0	188.3	8.6
20	6	188.3	193.1	197.8	9.5
21	6	197.8	203.3	208.7	10.9
Square G					
1	1	0	5.2	10.3	10.3
2	1	10.3	15.7	21.0	10.7
3	1+2	21.0	25.4	29.8	8.8
4	2+3	29.8	34.2	38.5	8.7
5	2+3	38.5	43.6	48.7	10.2
6	2+3+4	48.7	53.2	57.6	8.9
7	3+4	57.6	62.5	67.3	9.7
8	3+4	67.3	72.5	77.6	10.3
9	4	77.6	82.3	87.0	9.4
10	4+5	87.0	92.8	98.6	11.6
11	4+5	98.6	103.7	108.8	10.2
12	4+5	108.8	104.2	119.6	10.8
13	5	119.6	124.2	128.7	9.1
14	5	128.7	133.8	138.8	10.1
15	5+6	138.8	143.7	148.5	9.7
16	5+6	148.5	153.3	158.0	9.5
17	6	158.0	163.1	168.2	10.2
18	6	168.2	173.5	178.8	10.6
19	6	178.8	183.5	188.1	9.3
20	6	188.1	193.2	198.2	10.1
21	6	198.2	203.4	208.6	10.4
Square H					
1	1	0	4.7	9.4	9.4
2	1	9.4	14.6	19.7	10.3

XU	SU	Mean Depth at Top (cm)	Mean Depth at Centre (cm)	Mean Depth at Base (cm)	Mean Thickness (cm)
3	1+2	19.7	25.1	30.4	10.7
4	2+3	30.4	35.4	40.3	9.9
5	2+3	40.3	44.3	48.2	7.9
6	2+3+4	48.2	53.4	58.6	10.4
7	3+4	58.6	64.0	69.4	10.8
8	3+4	69.4	74.1	78.7	9.3
9	4	78.7	83.4	88.1	9.4
10	4+5	88.1	93.9	99.6	11.5
11	4+5	99.6	105.0	110.3	10.7
12	4+5	110.3	115.0	119.6	9.3
13	5	119.6	124.8	130.0	10.4
14	5	130.0	134.7	139.4	9.4
15	5+6	139.4	144.6	149.7	10.3
16	5+6	149.7	154.8	159.9	10.2
17	6	159.9	164.8	169.6	9.7
18	6	169.6	175.1	180.6	11.0
19	6	180.6	185.2	189.7	9.1
20	6	189.7	195.0	200.2	10.5
21	6	200.2	205.3	210.3	10.1
Square I					
1	1	0	4.8	9.6	9.6
2	1	9.6	14.2	18.8	9.2
3	1+2	18.8	23.5	28.2	9.4
4	2+3	28.2	33.8	39.4	11.2
5	2+3	39.4	44.2	48.9	9.5
6	2+3+4	48.9	54.1	59.3	10.4
7	3+4	59.3	64.6	69.8	10.5
8	3+4	69.8	75.1	80.3	10.5
9	4	80.3	85.4	90.5	10.2
10	4+5	90.5	95.7	100.8	10.3
11	4+5	100.8	105.5	110.2	9.4
12	4+5	110.2	115.3	120.3	10.1
13	5	120.3	125.5	130.7	10.4
14	5	130.7	135.4	140.1	9.4
15	5+6	140.1	145.8	151.4	11.3
16	5+6	151.4	156.7	161.9	10.5
17	6	161.9	167.5	173.0	11.1
18	6	173.0	178.1	183.2	10.2
19	6	183.2	188.3	193.3	10.1
20	6	193.3	197.7	202.1	8.8
21	6	202.1	207.2	212.3	10.2
Square J					
1	1	0	5.0	9.9	9.9
2	1	9.9	14.5	19.0	9.1
3	1+2	19.0	24.2	29.4	10.4
4	2+3	29.4	34.4	39.4	10.0
5	2+3	39.4	44.3	49.1	9.7

XU	SU	Mean Depth at Top (cm)	Mean Depth at Centre (cm)	Mean Depth at Base (cm)	Mean Thickness (cm)
6	2+3+4	49.1	53.9	58.7	9.6
7	3+4	58.7	64.2	69.6	10.9
8	3+4	69.6	74.4	79.1	9.5
9	4	79.1	84.2	89.2	10.1
10	4+5	89.2	94.1	99.0	9.8
11	4+5	99.0	106.3	113.5	14.5
12	4+5	113.5	118.1	122.6	9.1
13	5	122.6	128.1	133.6	11.0
14	5	133.6	138.0	142.3	8.7
15	5+6	142.3	147.8	153.3	11.0
16	5+6	153.3	157.7	162.0	8.7
17	6	162.0	167.0	171.9	9.9
18	6	171.9	177.4	182.9	11.0
19	6	182.9	187.8	192.6	9.7
20	6	192.6	197.7	202.7	10.1
21	6	202.7	207.8	212.9	10.2
Square K					
1	1	0	5.6	11.2	11.2
2	1	11.2	15.2	19.2	8.0
3	1+2	19.2	24.7	30.1	10.9
4	2+3	30.1	35.1	40.0	9.9
5	2+3	40.0	45.3	50.6	10.6
6	2+3+4	50.6	56.0	61.4	10.8
7	3+4	61.4	66.3	71.2	9.8
8	3+4	71.2	76.3	81.4	10.2
9	4	81.4	86.4	91.3	9.9
10	4+5	91.3	96.0	100.6	9.3
11	4+5	100.6	104.6	108.6	8.0
12	4+5	108.6	115.8	123.0	14.4
13	5	123.0	128.1	133.2	10.2
14	5	133.2	137.3	141.4	8.2
15	5+6	141.4	147.7	153.9	12.5
16	5+6	153.9	158.2	162.5	8.6
17	6	162.5	167.5	172.4	9.9
18	6	172.4	177.3	182.2	9.8
19	6	182.2	187.4	192.5	10.3
20	6	192.5	198.2	103.8	11.3
21	6	103.8	108.2	112.5	8.7
Square L					
1	1	0	4.6	9.1	9.1
2	1	9.1	14.4	19.6	10.5
3	1+2	19.6	24.2	28.7	9.1
4	2+3	28.7	33.7	38.6	9.9
5	2+3	38.6	44.1	49.5	10.9
6	2+3+4	49.5	54.6	59.7	10.2
7	3+4	59.7	64.3	68.9	9.2
8	3+4	68.9	73.3	77.7	8.8

XU	SU	Mean Depth at Top (cm)	Mean Depth at Centre (cm)	Mean Depth at Base (cm)	Mean Thickness (cm)
9	4	77.7	83.2	88.6	10.9
10	4+5	88.6	94.0	99.3	10.7
11	4+5	99.3	103.9	108.4	9.1
12	4+5	108.4	113.8	119.2	10.8
13	5	119.2	124.0	128.8	9.6
14	5	128.8	134.4	139.9	11.1
15	5+6	139.9	143.6	147.2	7.3
16	5+6	147.2	153.0	158.7	11.5
17	6	158.7	163.5	168.2	9.5
18	6	168.2	173.5	178.7	10.5
19	6	178.7	184.0	189.2	10.5
20	6	189.2	193.2	197.2	8.0
21	6	197.2	202.3	207.3	10.1
Square M					
1	1+2+3	0	25.0	50.0	50
2	2+3+4	50.0	55.8	61.5	11.5
3	3+4	61.5	66.5	71.4	9.9
4	3+4	71.4	76.7	81.9	10.5
5	4+5	81.9	89.4	96.8	14.9
Square N					
1	1+2+3	0	25.0	50.0	50
2	2+3+4	50.0	55.5	60.9	10.9
3	3+4	60.9	65.9	70.9	10.0
4	3+4	70.9	77.1	83.2	12.3
5	4+5	83.2	89.7	96.2	13.0
Square O					
1	1+2+3	0	25.0	50.0	50
2	2+3+4	50.0	54.3	58.5	8.5
3	3+4	58.5	63.9	69.2	10.7
4	3+4	69.2	74.3	79.3	10.1
5	4+5	79.3	86.3	93.3	14.0
Square P					
1	1+2+3	0	25.0	50.0	50
2	2+3+4	50.0	54.5	59.0	9.0
3	3+4	59.0	64.5	69.9	10.9
4	3+4	69.9	74.3	78.6	8.7
5	4+5	78.6	86.9	95.2	16.6
Square Q					
1	1+2+3	0	25.0	50.0	50
2	2+3+4	50.0	56.5	62.9	12.9
3	3+4	62.9	69.0	73.0	12.1
4	3+4	73.0	76.3	79.5	6.5
5	4+5	79.5	86.4	93.3	13.8
Square R					
1	1+2+3	0	25.0	50.0	50
2	2+3+4	50.0	56.1	62.1	12.1
3	3+4	62.1	67.0	71.8	9.7

XU	SU	Mean Depth at Top (cm)	Mean Depth at Centre (cm)	Mean Depth at Base (cm)	Mean Thickness (cm)
4	3+4	71.8	76.1	80.4	8.6
5	4+5	80.4	86.4	92.3	11.9
Square S					
1	1+2+3	0	25.0	50.0	50
2	2+3+4	50.0	55.3	60.5	10.5
3	3+4	60.5	65.2	69.8	9.3
4	3+4	69.8	74.7	79.5	9.7
5	4+5	79.5	89.0	98.5	19.0
Square T					
1	1+2+3	0	25.0	50.0	50
2	2+3+4	50.0	54.8	59.5	9.5
3	3+4	59.5	64.8	70.0	10.5
4	3+4	70.0	75.1	80.1	10.1
5	4+5	80.1	89.9	99.7	19.6
Square U					
1	1+2+3	0	25.0	50.0	50
2	2+3+4	50.0	54.7	59.4	9.4
3	3+4	59.4	64.7	70.0	10.6
4	3+4	70.0	75.2	80.3	10.3
5	4+5	80.3	91.7	103.0	22.7
Square V					
1	1+2+3	0	25.0	50.0	50
2	2+3+4	50.0	55.5	61.1	11.1
3	3+4	61.1	66.1	71.0	9.9
4	3+4	71.0	76.0	80.9	9.9
5	4+5	80.9	91.7	102.4	21.5
Square W					
1	1+2+3	0	25.0	50.0	50
2	2+3+4	50.0	54.5	58.9	8.9
3	3+4	58.9	63.0	67.0	8.1
4	3+4	67.0	71.6	76.2	9.2
5	4+5	76.2	86.6	97.0	20.8
Square X					
1	1+2+3	0	25.0	50.0	50
2	2+3+4	50.0	54.8	59.6	9.6
3	3+4	59.6	63.4	67.2	7.6
4	3+4	67.2	71.6	75.5	8.3
5	4+5	75.5	86.2	96.8	21.3
Square Y					
1	1+2+3	0	25.0	50.0	50
2	2+3+4	50.0	55.5	61.0	11.0
3	3+4	61.0	65.7	70.4	9.4
4	3+4	70.4	74.5	78.5	8.1
5	4+5	78.5	90.4	102.2	23.7
Square Z					
1	1+2+3	0	25.0	50.0	50
2	2+3+4	50.0	54.8	59.6	9.6

XU	SU	Mean Depth at Top (cm)	Mean Depth at Centre (cm)	Mean Depth at Base (cm)	Mean Thickness (cm)
3	3+4	59.6	64.3	68.9	9.3
4	3+4	68.9	74.0	79.1	10.2
5	4+5	79.1	90.8	102.4	23.3
Square AA					
1	1+2+3	0	25.0	50.0	50
2	2+3+4	50.0	54.8	59.6	9.6
3	3+4	59.6	64.1	68.6	9.0
4	3+4	68.6	74.9	81.2	12.6
5	4+5	81.2	91.9	102.5	21.3
Square AB					
1	1+2+3	0	25.0	50.0	50
2	2+3+4	50.0	54.7	59.4	9.4
3	3+4	59.4	64.2	69.0	9.6
4	3+4	69.0	74.5	80.0	11.0
5	4+5	80.0	89.2	98.4	18.4
Square AC					
1	1+2+3	0	25.0	50.0	50
2	2+3+4	50.0	56.6	63.2	13.2
3	3+4	63.2	66.8	70.3	7.1
4	3+4	70.3	75.5	80.6	10.3
5	4+5	80.6	89.2	97.7	17.1
Square AD					
1	1+2+3	0	25.0	50.0	50
2	2+3+4	50.0	57.0	64.0	14.0
3	3+4	64.0	67.1	70.2	6.2
4	3+4	70.2	75.6	80.9	10.7
5	4+5	80.9	89.5	98.1	17.2

Stratigraphy

Excavation proceeded to 2.84m maximum depth in both Squares A and B. In total 8.3 tons of sediment were excavated from Squares A and B. Tanamu 1 contains seven major Stratigraphic Units (SUs), each continuous across the excavated squares (Figures 2.14–2.21). Some SUs contain lenses or features; these have each been classified as sub-SUs (e.g., SU1a, SU5a, SU5b). A notable example of the latter is SU1a, a localized concentration of white ash (Figure 2.18) that brings to mind the residue of ethnographic low-temperature, open-fire pot making (e.g., May and Tuckson 2000: 61, Figure 2.31). With the exception of SU6 and SU7, which are in many ways similar to each other in terms of colour, texture and contents, all other SUs were clearly distinguishable from overlying and underlying SUs (see Figure 2.22 for details). The interfaces between SUs were generally easy to identify and typically measured *c.* 5cm thick, less commonly up to *c.* 10cm.

Neither bedrock nor basal clays were reached, with the lowermost deposits (SU7) consisting of sandy concretions in sandy sediments; small pieces of charcoal are for the most part present in the uppermost XUs of SU7, as these interface with SU6. SU7 is immediately overlain by sands containing abundant foraminifera, pumice and charcoal pieces (SU6). These sediments suggest low dune and/or beach-line (SU6) overlying beach-line and/or intertidal (SU7) conditions (Figure 2.14).

All SUs are sandy, with the uppermost SU1, SU3, and SU5 (the Upper, Middle, and Lower Horizons respectively) containing rich cultural deposits (Figures 2.15, 2.17, 2.19); these three rich cultural layers are separated by the culturally more sparse SU2, SU4 and basal SU6–SU7 (e.g., Figures 2.16, 2.18, 2.20). While the sandy nature of the deposits made excavation relatively easy, most layers were moderately to well consolidated and compact (see Figure 2.22 for details). SU4 and SU6 contain numerous

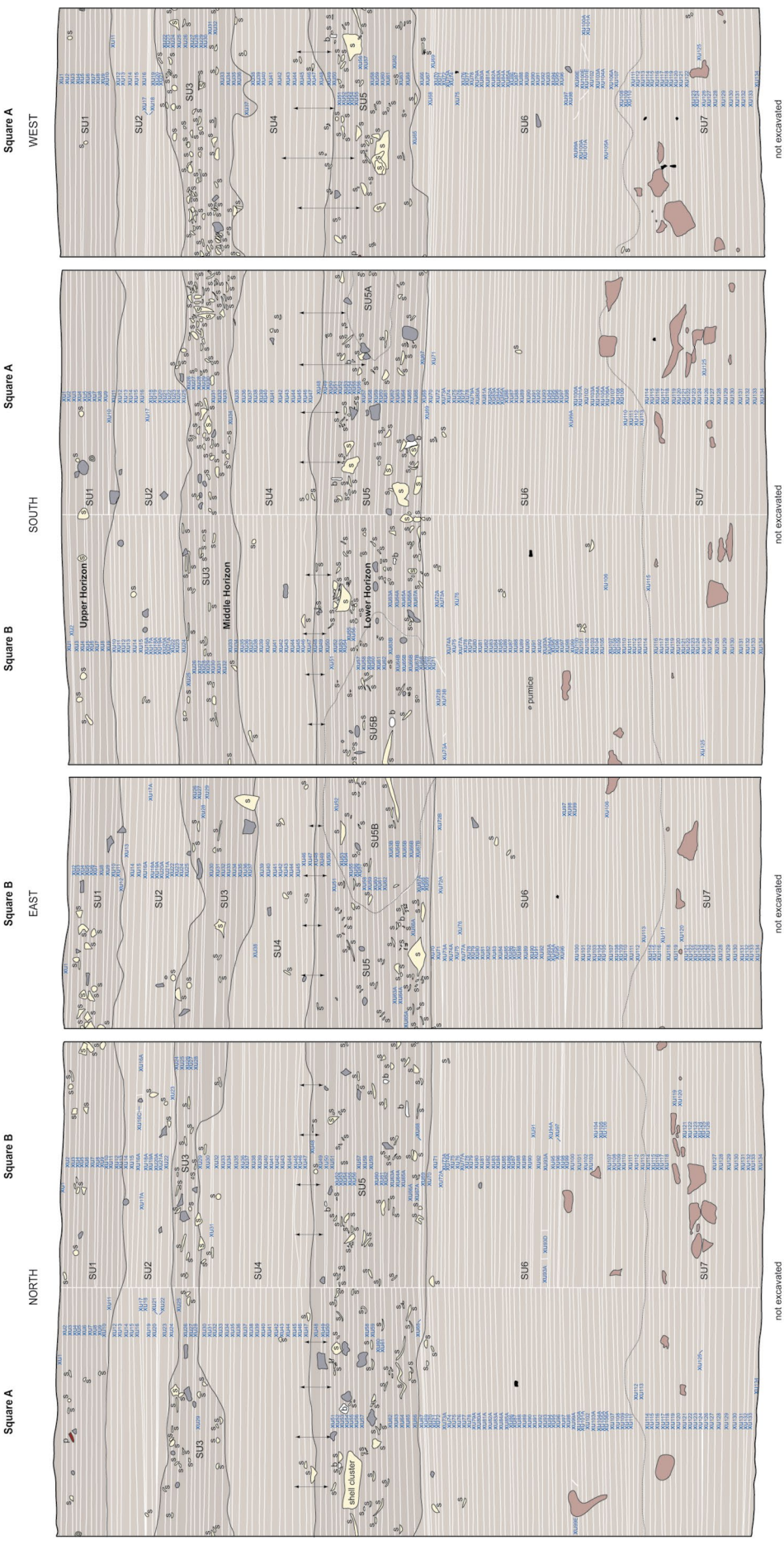

Figure 2.14. Section drawing, Tanamu 1 Squares A and B. The XU lines were plotted from the elevation readings.

linear sub-vertical but diffuse, whitish sediment stains, consistent with geochemical alteration of sediments associated with grass root staining, indicating the presence of ancient land surfaces at the base of SU3 and SU5 respectively (in each case representing the upper limits of the root-stained horizons). The lowermost SU7 contains abundant clasts of concreted sand caused by elevated moisture levels. Cultural deposits are present in all SUs, although these are noticeably less abundant in SU7.

There is no archaeological or ethnographic evidence that the vicinity of Tanamu 1 was ever used for gardening activity. For a dune deposit, the Tanamu 1 sediments show good chronostratigraphic integrity, with the radiocarbon determinations showing no significant reversals between cultural phases (see Radiocarbon Dating).

We note that termite larvae husks and recent grass seeds are only present in numbers within SU1, while below this they were noted during excavation as post-depositional blow-ins on windy days (always as one-off instances or in very low numbers).

Radiocarbon dating

Fifty-nine radiocarbon dates have been obtained from Squares A and B (Figure 2.23). All are accelerator mass spectrometry (AMS) dates on single pieces of charcoal (34 dates) or shallow-water marine shell (25 dates). Two species of shell were dated, *Anadara antiquata* and *Gafrarium tumidum,* with ΔR values for each species

Figure 2.15. Excavation in progress within the dense Upper Horizon of SU1, Square B after excavation of XU4. The pink stringline marks the south side.

Figure 2.16. Excavation in progress in Square B (after completion of XU22) showing the localised concentration of cultural materials (the Upper Horizon of SU1) a short distance below the present-day surface (top of photo). The culturally-poor sediments between the Upper and Middle Horizons are evident beneath this upper concentration of cultural materials. The uppermost shells of the Middle Horizon are appearing at the base of the excavation as this dense Lapita level is just starting to be exposed.

Figure 2.17. Excavation in progress within the dense Middle Horizon of SU3 (Lapita horizon), Square A after excavation of XU29.

Figure 2.18. Excavation in progress in the culturally-sparse SU4 below the Middle Horizon, Square A after completion of XU41. The distinctive localised white band of SU1a is clearly visible in the upper part of the excavation pit's back wall, as are the light-coloured sub-vertical root stains in SU4 just below the culturally rich Middle Horizon.

Figure 2.19. Excavation in progress within the dense Lower Horizon of SU5 (pre-ceramic horizon), Squares A and B after excavation of XU66.

Figure 2.20. Excavation in progress in SU6 immediately below the Lower Horizon, Squares A and B after excavation of XU77.

Figure 2.21. Excavation after completion of XU94 (mid-levels of SU6) in Squares A and B, showing diffuse charcoal-rich patches on the north wall.

Figure 2.22. Stratigraphic Units, Tanamu 1.

SU	Typical depth below ground (cm)	Dry Munsell	Description
1	0–20	10YR 3/2	This SU contains the culturally dense Upper Horizon concentrated especially in the SU's upper half. Soft, humic, very dark greyish brown aeolian sand with dense shell, stone artefact and pottery concentration in the NE part of Square B. Grass rootlets are abundant. The very dark grey colouring is probably due in part at least to organic decomposition and staining as typical of local topsoil development. Fairly compact. SU1a (see Figure 2.18) is a localized white horizontal band of indeterminate ash, or possibly shell carbonate, at the base of SU1 along and into the very edge of the south wall of Square A and, to a much lesser extent, Square B, where it delimits the base of SU1. As only the very edge of this sub-SU was exposed, without significantly sampling SU1a in the excavation itself, we are not certain whether it represents a hearth or a shell lens. SU1a has a very distinct boundary with the underlying SU2. Elsewhere SU1 typically grades into SU2 over a thickness of *c.* 5cm.
2	20–50	10YR 4/3 to 10YR 4/4	Culturally sparse, soft, dark greyish brown to dark yellowish brown aeolian sand, lighter in colour than SU1, with some whole shells noted *in situ*. Boundary with underlying SU3 is fairly distinct, typically grading over a thickness of *c.* 5cm. SU2a: Towards the base of SU2 in Square B, isolated as XU16b–XU21b and XU16c–XU17c, and measuring a maximum *c.* 50cm × 20cm in size, is a well-defined area of loose and similarly coloured but slightly darker sand than the rest of the square. It is located just NE of the centre of the square (it does not feature in the section drawings as it does not cross into any of the square's walls). It is likely to be an in-filled animal burrow. No cultural materials were seen within this feature during excavation, and it is restricted to SU2.
3	50–70	10YR 4/3	Middle Horizon. Rich, compact but relatively unconsolidated cultural layer composed of dark greyish brown aeolian sand and high quantities of whole and fragmented shell, pottery sherds and stone artefacts. Boundary with underlying SU4 is distinct, in the main grading over a thickness of *c.* 5cm.
4	70–110	10YR 5/2	Soft, greyish brown aeolian sand with high quantities of comminuted shell and some whole shells. Boundary with underlying SU5 is diffuse, typically grading over a thickness of *c.* 10cm but sometimes more. SU4 contains numerous sub-vertical patches or pockets of light-coloured sandy sediments that are more compact than surrounding sediments and reminiscent of root staining. The SU4/SU5 interface consists of greyish brown aeolian sand with occasional whole shell in its upper sections, grading down to a grey to greyish brown loamy sand. Small amounts of small, degraded pottery sherds occur in this underlying level.

SU	Typical depth below ground (cm)	Dry Munsell	Description
5	110–150	10YR 5/1 to 10YR 5/2	Lower Horizon. SU5 is a grey to greyish brown loamy sand with compact, light-coloured patches and copious amounts of larger-sized shell (whole and broken), animal bone and stone artefacts. The high density and high diversity of shell stands it apart as a distinct cultural horizon, as does the complete absence of ceramics. Sediments are compact, with shell fragments often tending to cement together. Charcoal is present. Pumice, coral and rock are also present in moderate quantities. Some small roots also occur. Sediments are easy to excavate. SU5's lower boundary is distinct, in the main grading with SU6 over a thickness of *c.* 5cm. SU5a is a poorly-defined patch of aeolian sand with small quantities of fragmented shell. It is soft and homogeneous in colour and texture, and appears to be a local variation of SU5. SU5b is a loamy sand with some ash, burned shell (whole and broken), animal bone, coral, pumice, charcoal and stone artefacts. The shell in particular is burned. Sediment is compact and homogenous in colour and texture. SU5b is similar to SU5 in terms of contents but different in colour, texture and general appearance. It is interpreted as a hearth or oven. It occurs in the southeast parts of Square B in XU49–XU70, where it was only isolated during excavation in its lower levels, at XUs 63b–XU67b and XU72b–XU74b.
6	150–240	2.5YR 6/2	SU6 is a light brownish grey sand. Cultural materials are sparse but continue to occur in most XUs. Small charcoal fragments occur throughout. The sparse comminuted shell fragments are typically 2–4mm long with sub-rounded edges. Pumice and foraminifera are present throughout. SU6 contains numerous compact, light-coloured clayey sand patches or vertical pockets reminiscent of the marks of roots/rootlets. The boundary with SU7 is indistinct. SU6a is a small, localized but diffuse patch of hard, light-coloured sediment with *in situ* charcoal restricted to within SU6. It is *c.* 40cm × 30cm in size. It occurs near the northeast corner of Square A but does not feature in any of the section walls. It was isolated during excavation as XU79c–XU85c and may be the remnants of a hearth. SU6b is a localized but diffuse patch of hard, dark sediment with *in situ* charcoal. It is *c.* 30cm × 30cm in size and continues into the west wall of Square A. It is present in XU96–XU101 of Square A, where it was only isolated *in situ* in XU99e–XU101e. It is likely to be the remnants of a hearth. Other charcoal-rich patches of similar contents occur elsewhere in Squares A and B at this stratigraphic level but have not been demarcated on the section drawings because they are diffuse.
7	>240	2.5YR 6/2 to 2.5YR 6/3	SU7 is a moist, soft, fine light brownish grey to light yellowish brown sand. Sediments are compact, and coral fragments and concreted sand and shell are present. Coral fragments vary in length from 2–10cm. Some small fragments of crustacean and shell (broken and whole) occur but are not abundant. Patches or vertical pockets of compact, lighter-coloured clayey sand occur within the upper levels of SU7. Dried roots were found within some of these patches/pockets. Although some small charcoal fragments are evident at the SU6–SU7 interface; SU7 contains sparse cultural materials.

being calculated separately for this part of Caution Bay: -1 ± 16 ^{14}C years for *Anadara antiquata* and 67 ± 16 ^{14}C years for *Gafrarium tumidum* (see David *et al.* 2016a; Petchey *et al.* 2012, 2013 for details of the Caution Bay shell ΔR program).

The charcoal samples were typically millimetre-scale in length, amorphously sub-spherical in shape, and weighed on average 0.1 ± 0.1g, whereas the shell samples were a few centimeters long, flat shell valves (or valve fragments) that averaged 5.7 ± 5.2g in weight. These different sample characteristics allow for future taphonomic assessments of the radiocarbon-dated sequence by investigating the chronostratigraphic integrity of dated materials relative to sample weights and shapes, with the small charcoal samples having greater potential to post-depositionally move through the deposit than the larger and flatter shell samples which tended to lie sub-horizontally in the ground. Nevertheless, at Tanamu 1 the dated sequence is in good chronostratigraphic order irrespective of the size of the sample or whether small charcoal samples or larger, flat shell valves were used for dating (with charcoal samples containing small in-built old wood ages; see below); more detailed taphonomic analyses have therefore not been undertaken. The only date significantly out of sequence is Wk-32535 (2971 ± 30 BP) on shell from XU8 at the base of SU1 in Square B, an horizon otherwise only containing dates more recent than 700 cal BP. Wk-32535 is a shell sample obtained from 14–16cm below ground, separated by only 4cm from the broad horizon of that age below it (the top of which is at 20cm depth). Here the indication is thus of an age reversal over a depth of 4cm only, within the

depth of sediment mixing evident by visually observed stratigraphic interfaces at Tanamu 1.

The radiocarbon determinations indicate that the basal excavated SU7 sediments accumulated around 5000 cal BP. The *c.* 90cm-thick sediments of SU6 then began to build up rapidly as dune sands sometime between 4700 and 4450 cal BP, at an average rate of 60cm/100 years (for purposes of calculation taking 4500 cal BP as the start of accumulation of SU6, and 4350 cal BP as dating the top of SU6, with calibrated ages having been rounded to the closest 50 years). In SU6 on the whole, the shell dates appear to be slightly younger than the charcoal dates, suggesting small inbuilt (old wood) ages for the charcoal. This implies that SU6 is of a similar age to the lower part of SU5 (*c.* 4300 cal BP). SU6 represents the peak period of dune-building at Tanamu 1, suggesting that seaward of the dune the site was an open landscape during this period (i.e., devoid of shielding mangroves separating the beach from the land), conducive to the aeolian accumulation of beach-bordering sand dunes.

Next, between 4350 and 4050 cal BP, a dense cultural shell midden accumulated as the SU5 Lower Horizon on the then 90 cm-high beach-bordering sand dune. During this time some 40cm of cultural deposits built up over a 300 year period (at an average rate of 13cm/100 years). During this prolonged period there is no evidence of site abandonment in the stratigraphy, suggesting the persistence of a permanent or semi-permanent settlement over this span of time. However, within SU5 the radiocarbon determinations show a jump from *c.* 4300–4350 to *c.* 4100 cal BP over a shallow stratigraphic zone around XU60 in both squares, but there is no hint of a corresponding change in sediment characteristics in the sections. It could be that part of the picture is missing in the dates and that the upper and lower parts of SU5 (*c.* 4100 and *c.* 4300–4350 cal BP respectively) and SU6 just represent continued occupation over *c.* 300 years.

Following cessation of the SU5 settlement, some 40cm of dune sands continued to slowly accumulate at an average rate of 3cm/100 years between 4050 and 2800 cal BP (representing SU4). Cultural materials in SU4 are sparse, and may represent post-depositional intrusions from overlying (SU3) and underlying (SU5) dense occupation deposits, rather than *in situ* cultural materials.

Dense Lapita occupation deposits dated to the period *c.* 2800 to 2750 cal BP, comprise the Middle Horizon. During this time, *c.* 20cm of rich cultural deposit accumulated as SU3 at an average rate of *c.* 40cm/100 years on top of what was then a 1.7m-high sand dune. This horizon represents the arrival of the first ceramicists at Tanamu 1. The dense Middle Horizon shows no chronostratigraphic evidence of abandonment during this period, and thus signals the presence of a permanent settlement at Tanamu 1.

Around 2750 cal BP, SU3 deposition ceased as Lapita peoples abandoned their settlement at Tanamu 1. However, Lapita ceramicists remained in the area, as indicated by occasional Lapita ceramics in the overlying *c.* 30 cm-thick culturally sparse sands of SU2, dated from 2750 to 700 cal BP and suggestive of slow sand accumulation. The presence of a Lapita settlement lasting until 2600 cal BP at Bogi 1, 140m to the NNW of Tanamu 1, is consistent with the presence of post-2750 cal BP ceramics in SU2 at Tanamu 1 (McNiven *et al.* 2012a). The period covered by SU2 is also notable for spanning close to 2050 years, incorporating the period *c.* 2150–2100 cal BP that saw dense occupation during a phase of Linear Shell Edge-Impressed ceramics at Bogi 1 nearby (David *et al.* 2012). But unlike Bogi 1, at Tanamu 1 that phase is not marked as a distinct stratigraphic horizon. Rather, the SU2 sediments accumulated at an average rate of 1cm/100 years, indicating that by the end of the Lapita period Middle Horizon, dune building had virtually ceased. The presence of a single Linear Shell Edge-Impressed sherd from Square B XU19 (see Chapter 3)—located some two-thirds of the way down in SU2 (36–38cm below ground)—of a ceramic type firmly dated to 2150–2100 cal BP at Bogi 1 (David *et al.* 2012), followed by more recent ceramics in overlying XUs, supports the interpretation of SU2 resulting from the continued slow buildup of sediments during the post-Lapita period, rather than an archaeologically instantaneous accumulation of sediments immediately post-dating the termination of the Middle Horizon around 2750 cal BP.

The Tanamu 1 dune-top appears to have remained relatively stable from 2750 to 700 cal BP. During this time little cultural activity is evident, although post-depositional mixing at the SU1–SU2 stratigraphic interface makes it difficult to distinguish cultural materials attributable to any particular period. The subsequent accumulation of SU1 sediments (the Upper Horizon) after 700 cal BP first saw the buildup of fairly sparse cultural sediments between 700 and *c.* 200 cal BP (Upper Horizon A), followed in upper SU1 by dense ceramic deposits dated from *c.* 200 to 100 cal BP, just prior to the ethnographic period (late 1800s AD) (Upper Horizon B). The *c.* 20cm-thick SU1 accumulated between 700 and *c.* 100 cal BP at an average rate of *c.* 3cm/100 years.

Cultural materials

The quantities and vertical distributions of the different cultural material classes are briefly discussed here relative to site stratigraphy and chronology; Figures

Figure 2.23. Radiocarbon determinations, Tanamu 1.
All ^{14}C ages are AMS. Calibrations undertaken using OxCal 10.4.1 (charcoal calibrations: INTCAL09 curve selection; shell calibrations: MARINE09 curve selection, *Anadara antiquata* ΔR = -1 ± 16; *Gafrarium tumidum* ΔR = 67 ± 16) (Bronk Ramsey 2013; Petchey *et al.* 2013; Reimer *et al.* 2009).

Square	XU	SU	Depth (cm)	Wk-Laboratory Code	Material Dated	$\delta^{13}C$‰	% Modern	^{14}C Age (years BP)	Calibrated Age BP (68.2% probability)	Calibrated Age BP (95.4% probability)	Median Calibrated Age BP
B	2	1	2.8	29957	charcoal	-24.7 ± 0.2	98.6 ± 0.3	117 ± 30	270–220 150–60 50–20	270–180 150–10	120
A	4	1	4.2	29966	charcoal	-25.1 ± 0.2	98.5 ± 0.4	123 ± 30	270–210 150–60 40–20	280–170 160–10	120
B	3	1	3.1–5.4	32532	*Anadara antiquata* shell	-2.4 ± 0.2	92.9 ± 0.3	593 ± 25	290–220 210–190 170–140	300–130	240
B	4	1	5.4–7.2	32533	*Anadara antiquata* shell	-2.2 ± 0.2	93.1 ± 0.3	575 ± 25	270–180 170–140	290–120	210
A	4	1	7.3	27504	charcoal	-26.5 ± 0.2	97.6 ± 0.2	193 ± 30	290–260 220–140 20–-10	310–250 230–130 30–-10	180
B	5	1	7.2–9.2	32534	*Anadara antiquata* shell	-2.7 ± 0.2	93.5 ± 0.3	538 ± 25	240–130	270–60	180
A	5	1	8.8	29967	charcoal	-25.5 ± 0.2	98.6 ± 0.4	117 ± 30	270–220 150–60 50–20	270–180 150–10	120
A	7	1	12.5	29968	charcoal	-24.5 ± 0.2	90.9 ± 0.3	769 ± 30	730–670	740–660	700
B	8	1	13.9–16.0	32535	*Anadara antiquata* shell	0.6 ± 0.2	69.1 ± 0.3	2971 ± 30	2780–2710	2830–2680	2750
B	9	1	16.7	29958	charcoal	-26.1 ± 0.2	99.2 ± 0.4	66 ± 33	260–220 140–110 80–30	260–220 150–20	100
A	9	1	17.4	27505	charcoal	-24.4 ± 0.2	90.2 ± 0.1	826 ± 30	770–690	790–680	730
B	10	1–2	20.0	29959	charcoal	-27.1 ± 0.2	98.1 ± 0.4	158 ± 30	290–250 230–130 30–0	290–60 40– -10	170
B	11	1–2	19.7–21.5	32536	*Gafrarium tumidum* shell	1.3 ± 0.2	68.5 ± 0.2	3042 ± 26	2780–2710	2830–2690	2750
B	15	2	27.9–30.3	32537	*Anadara antiquata* shell	-0.7 ± 0.2	68.4 ± 0.2	3053 ± 28	2860–2760	2920–2740	2820
B	22	2–3	41.6–43.6	32538	*Anadara antiquata* shell	0.8 ± 0.2	68.2 ± 0.3	3080 ± 31	2900–2780	2950–2750	2850
B	25	2–3	47.3–49.9	32540	*Gafrarium tumidum* shell	0.5 ± 0.2	68.9 ± 0.3	2990 ± 31	2750–2680	2790–2590	2710
B	25	2–3	47.3–49.9	32539	*Anadara antiquata* shell	0.4 ± 0.2	68.9 ± 0.3	2993 ± 31	2800–2720	2850–2700	2760
B	28	2–3–4	53.6–55.3	32541	*Anadara antiquata* shell	1.1 ± 0.2	68.8 ± 0.2	3000 ± 27	2810–2730	2850–2710	2770

Square	XU	SU	Depth (cm)	Wk-Laboratory Code	Material Dated	$\delta^{13}C‰$	% Modern	^{14}C Age (years BP)	Calibrated Age BP (68.2% probability)	Calibrated Age BP (95.4% probability)	Median Calibrated Age BP
B	31	3–4	60.4–62.0	32542	*Anadara antiquata* shell	0.5 ± 0.2	68.2 ± 0.2	3078 ± 26	2890–2780	2940–2750	2840
B	34	3–4	66.8–69.6	32543	*Anadara antiquata* shell	0.1 ± 0.2	68.6 ± 0.2	3024 ± 26	2830–2740	2870–2720	2790
A	35	3–4	70.5	27506	charcoal	-26.7 ± 0.2	70.2 ± 0.2	2842 ± 30	3000–2920 2910–2880	3070–2860	2950
B	37	3–4	73.7–75.9	32544	*Anadara antiquata* shell	0.4 ± 0.2	68.4 ± 0.2	3055 ± 27	2860–2760	2920–2740	2820
B	40	4	81.1–83.4	32545	*Anadara antiquata* shell	0.1 ± 0.2	68.5 ± 0.2	3035 ± 28	2840–2750	2890–2720	2800
B	43	4	87.7–90.3	32546	*Anadara antiquata* shell	0.8 ± 0.2	68.6 ± 0.2	3024 ± 29	2830–2740	2880–2720	2790
B	46	4–5	95.4–97.3	32547	*Anadara antiquata* shell	0.5 ± 0.2	65.9 ± 0.2	3350 ± 26	3280–3160	3330–3100	3220
B	49	4–5	102.5–104.7	32548	*Anadara antiquata* shell	0.1 ± 0.2	60.2 ± 0.2	4076 ± 27	4180–4060	4230–3990	4120
B	53	5	110.4–112.3	32549	*Anadara antiquata* shell	-0.2 ± 0.2	60.5 ± 0.2	4032 ± 29	4110–3980	4170–3920	4050
A	53	4–5	115.8	27508	charcoal	-25.2 ± 0.2	62.8 ± 0.1	3734 ± 30	4150–4070 4040–3990	4220–4200 4160–3980	4090
B	58	5	122.1	29961	charcoal	-26.3 ± 0.2	63.0 ± 0.2	3715 ± 30	4150–4120 4100–4060 4050–3980	4150–3970	4050
B	60	5	124.6	29962	charcoal	-26.0 ± 0.2	62.1 ± 0.2	3829 ± 30	4290–4270 4260–4150	4410–4310 4300–4140 4120–4100	4230
A	59	5	125.1	29969	charcoal	-26.2 ± 0.2	61.9 ± 0.2	3858 ± 32	4410–4320 4300–4230 4200–4180	4420–4220 4210–4150	4290
B	65b	5	135.1	29963	charcoal	-24.1 ± 0.2	61.8 ± 0.2	3864 ± 32	4410–4320 4300–4230	4420–4220 4210–4150	4300
A	66	5–6	144.9	27714	charcoal	-25.6 ± 0.2	61.4 ± 0.2	3919 ± 30	4420–4350 4340–4290	4430–4240	4360
A	75	6	159.1	27643	charcoal	-26.3 ± 0.2	61.6 ± 0.2	3895 ± 30	4410–4290	4420–4240	4340
A	80a	6	167.7	29970	charcoal	-26.0 ± 0.2	61.0 ± 0.2	3968 ± 31	4520–4470 4450–4410	4530–4380 4370–4350 4330–4290	4440
A	81a	6	172.6	27644	charcoal	-24.8 ± 0.2	61.2 ± 0.2	3941 ± 30	4440–4380 4370–4350 4330–4290	4520–4470 4450–4280 4270–4250	4390
A	83c	6	174.4	29341	charcoal	-24.5 ± 0.2	61.0 ± 0.3	3968 ± 39	4520–4460 4450–4400	4530–4290	4440
A	83a	6	175.8	29340	charcoal	-26.7 ± 0.2	60.4 ± 0.2	4053 ± 30	4580–4510 4490–4440	4790–4760 4620–4420	4530
A	85a	6	177.3	28805	charcoal	-23.4 ± 0.2	60.6 ± 0.3	4021 ± 33	4530–4430	4570–4410	4480
B	87	6	178.7–180.9	31008	*Anadara antiquata* shell	0.0 ± 0.2	58.8 ± 0.2	4268 ± 25	4440–4320	4500–4270	4380

Square	XU	SU	Depth (cm)	Wk-Laboratory Code	Material Dated	$\delta^{13}C‰$	% Modern	^{14}C Age (years BP)	Calibrated Age BP (68.2% probability)	Calibrated Age BP (95.4% probability)	Median Calibrated Age BP
B	87	6	178.7–180.9	31007	*Gafrarium tumidum* shell	0.8 ± 0.2	58.7 ± 0.2	4285 ± 25	4390–4270	4420–4210	4320
B	87	6	178.7–180.9	31009	*Anadara antiquata* shell	-0.3 ± 0.2	58.5 ± 0.2	4313 ± 25	4500–4400	4540–4340	4440
A	89	6	186.2	27645	charcoal	-24.5 ± 0.2	60.5 ± 0.2	4042 ± 30	4570–4440	4790–4760 4610–4600 4590–4420	4500
A	90	6	188.1	27646	charcoal	-26.0 ± 0.2	60.7 ± 0.2	4012 ± 30	4520–4430	4570–4550 4530–4410	4480
A	93	6	198.1	27647	charcoal	-26.5 ± 0.2	60.5 ± 0.2	4037 ± 30	4570–4560 4530–4430	4780–4760 4580–4420	4490
A	97	6	202.3	29971	charcoal	-25.9 ± 0.2	61.0 ± 0.2	3969 ± 32	4520–4470 4450–4410	4530–4380 4370–4350 4330–4290	4440
A	102	6	212.1	29977	charcoal	-25.0 ± 0.2	61.2 ± 0.2	3949 ± 30	4520–4480 4450–4400 4370–4350 4330–4300	4520–4460 4450–4290	4420
A	103a	6	214.1	29972	charcoal	-26.3 ± 0.2	60.9 ± 0.2	3978 ± 31	4520–4470 4450–4410	4530–4400 4370–4350 4330–4300	4470
A	106a	6–7	220.0	29978	charcoal	-25.7 ± 0.2	61.0 ± 0.2	3965 ± 32	4520–4470 4450–4410	4530–4350 4330–4290	4440
B	111	6–7	225.7–228.2	32550	*Gafrarium tumidum* shell	1.1 ± 0.2	58.4 ± 0.3	4318 ± 37	4420–4290	4490–4230	4360
A	109	6–7	227.3	28604	charcoal	-24.9 ± 0.2	60.2 ± 0.2	4071 ± 30	4790–4760 4610–4510 4470–4440	4810–4760 4700–4670 4650–4510 4490–4440	4560
B	113	6–7	229.7–232.3	32551	*Anadara antiquata* shell	0.2 ± 0.2	60.6 ± 0.2	4029 ± 27	4100–3970	4160–3920	4050
A	111	6–7	231.2	29974	charcoal	-30.8 ± 0.2	61.2 ± 0.2	3949 ± 30	4520–4480 4450–4400 4370–4350 4330–4300	4520–4460 4450–4290	4420
A	112	6–7	232.3	29984	charcoal	-26.0 ± 0.2	59.6 ± 0.2	4154 ± 27	4820–4780 4770–4750 4730–4620	4830–4780 4770–4580	4700
B	114	6–7	232.9	29964	charcoal	-24.5 ± 0.2	61.0 ± 0.2	3971 ± 30	4520–4480 4450–4410	4530–4400 4370–4350 4330–4290	4450
B	116	6–7	238.8	29965	charcoal	-25.5 ± 0.2	60.1 ± 0.2	4093 ± 30	4790–4760 4630–4520	4810–4750 4710–4510 4470–4440	4600
A	118	7	244.8	29212	charcoal	-24.5 ± 0.2	60.1 ± 0.3	4091 ± 35	4790–4760 4630–4520	4820–4750 4710–4510 4490–4440	4600
B	127	7	258.0–260.7	32552	*Anadara antiquata* shell	0.2 ± 0.2	55.2 ± 0.2	4766 ± 30	5120–5090 5080–4940	5200–4880	5020
B	130	7	266.6–269.6	32553	*Gafrarium tumidum* shell	0.0 ± 0.2	55.5 ± 0.2	4727 ± 30	4920–4820	4990–4800	4880

2.24 and 2.25 quantify the cultural materials excavated from Squares A and B by XU. Detailed analyses of the ceramics, stone artefacts, shell, non-molluscan fauna, and worked shell are presented in Chapters 3–7 respectively. In Figure 2.26 the Tilia-Tiliagraph program suite was used for the diagrammatic presentation of data (Grimm 1991); the zone boundaries follow the stratigraphically-constrained classification sub-routine (CONISS dendrogram) that is part of the Tilia program. All archaeological categories in Figure 2.22 were used as input into CONISS.

In both Squares A and B charcoal is consistently present in moderate quantities in virtually all XUs in SU1 (the Upper Horizon) and SU6 (Figure 2.24). Charcoal is sporadically found in all other SUs, but in markedly lower quantities.

A total of 1171 pottery sherds totaling 1942.5g were excavated from Squares A and B. One hundred and twenty-one of these (10.3% by number) are ≥3cm long. A further 52 sherds ≥3cm long, plus a near-complete vessel, were retrieved from the stepping-out squares. The lowermost ceramic sherd ≥3cm long comes from 72–74cm below surface, in XU36 of Square B at the very base of the Middle Horizon (SU3/SU4 interface). Fifteen sherds <3cm long came from SU4, mainly from the interface with SU3, where vertical root stains connecting the two SUs are abundant (see Figure 2.15). We thus conclude that the first ceramics at Tanamu 1 relate to the base of the SU3 Middle Horizon, dating to *c.* 2800 cal BP. All the ceramics in SU3 (2800–2750 cal BP) are Lapita. In contrast, ceramics from the Upper Horizon (700–100 cal BP) are markedly different in character—plain wares, occasionally with maker's marks, and with vessel forms similar to the ethnographic *uro*. The decorative characteristics and vessel forms of the Tanamu 1 ceramics are described in detail in Chapter 3.

A total of 2317 stone artefacts collectively weighing 1661.6g were excavated from Squares A and B. These are distributed throughout the excavated sediments, with notable concentrations in the Upper, Middle and Lower Horizons and several lesser ones in SU6 (Figure 2.26). A notable feature of the Lapita Middle Horizon (SU3) stone artefact assemblage is its high degree of thermal alteration in comparison with assemblages from the other stratigraphic units. The small ground-stone industry, made on various igneous materials, includes a possible grinding stone and an adze blank that were found in SU1 and SU7 respectively. Most of the flaked stone assemblage was made on chert, with a small representation of chalcedony and basalt, as well as single quartz and obsidian items, the latter found in mid-SU2. The lowermost stone artefacts (all cherts) came from 276–278cm depth, in XU133 (Squares A and B) at the base of SU7. Their presence, albeit in low numbers in levels dating to *c.* 5000 cal BP, signals the earliest documented human occupation of Tanamu 1 (see Chapter 4).

Molluscan remains recovered during the excavation are the most abundant category of cultural material recovered from Tanamu 1 by far, with a total shell sample of 127,356g. Of these, 80% could be identified to family, genus or species level. Squares A and B yielded a combined total MNI of 14,665. The greatest amount of cultural shell by both MNI and weight is found at the SU5/SU6 interface in Square A and at the base of SU5 in Square B, although cultural shell is found in varying quantities throughout the deposit down to the base of SU6. The Upper Horizon SU1 is meager in both shell abundance and diversity (only 20 species) when compared with the Lapita period Middle Horizon SU3 (60+ species) and the pre-ceramic Lower Horizon SU5 (90+ species). Details of the molluscan taxonomic analysis and quantification results, and the indicated range of habitats exploited as represented by the assemblages from each SU, are presented and discussed in Chapter 5.

Squares A and B at Tanamu 1 produced a total 2758g of bone, 840g of crustacean (crab) exoskeleton, 8g of cuttlefish endoskeleton, 5g of echinoderm (urchin) exoskeleton, and 0.1g of avian eggshell (see Chapter 6). The highest concentration of bone was found in SU5 (Lower Horizon), although bone was present in most XUs throughout the excavation down to the base of the excavation in SU7. The other remains had more restricted distributions. Aside from small numbers in upper SU1 (Upper Horizon B), crab was only present in most XUs from about the middle of SU3 (Middle Horizon) down to the base of SU7, and like bone, concentrated in SU5 (Lower Horizon). Unlike bone and crab, urchin was concentrated in SU3 (Middle Horizon) and SU4, with sporadic occurrences in SU1, SU5 and SU6, down to XU105 in Square A. Although some variation is observed in the extent of bone surface corrosion through the profile, at no point in the sequence are the remains so degraded as to suggest a major quantitative loss through post-depositional processes.

Tanamu 1 contains a sizable worked shell assemblage, with items recovered from SU3, SU4, SU5, and SU6, and thus in association with both Lapita and pre-Lapita levels. The majority, however, were found in unambiguously pre-Lapita levels, with only a single piece of worked *Rochia nilotica* recovered from the Lapita-age SU3 (Middle Horizon). Two shell artefacts were recovered from SU4, ten from SU5 (Lower Horizon), and six from SU6 (see Figures 2.24–2.25). The positioning of the worked shells in the stratigraphy, the general limited evidence for downward movement of materials, and the nature of the shell artefacts themselves all

indicate that the strong trend of association of most of the shell artefacts with pre-Lapita deposits is reliable (see Szabó *et al.* 2021). Full details of all shell artefacts are presented in Chapter 7.

Conclusion

SU1, SU3, and SU5 thus contain chronologically well-defined, vertically discrete, rich occupation deposits that are bounded by the relatively culturally sparse sediments of SU2, SU4 and SU6. The three stratigraphic

Figure 2.24. General list of excavated materials by XU, Tanamu 1 Square A.

XU	Shell	Non-Human Bone	Crab	Sea Urchin	Cuttlefish	Human Bone	Charcoal	Ceramic Sherds		Stone Artefacts		Worked Bone	Worked Shell		Land Snail Shell	Foraminifera	Pumice	Termite Larvae Husks	Seeds (Other than Modern Grass)
	g	g	g	g	g	g	g	#	g	#	g	g	#	g	g	g	g	g	g
1	397.7	0.02	0.37					9	8.6	6	1.9							0.04	19.2[a]
2	127.5	0.5	0.01					22	19.7	24	20.0							0.38	
3	548.5	3.79					0.15	46	51.4	69	39.5							2.37	
4	1,034.9	12.1					1.40	76	166.4	68	57.4							10.58	
5	1,911.2	17.25		0.04			6.36	23	80.2	49	68.4				0.10			8.09	
6	670.0	4.57	0.01				1.65	15	12.2	31	4.7				<0.01				
7	50.4	3.81		0.41			2.55	4	14.0	20	27.0				<0.01			1.90	
8	51.6	6.93					1.03	11	9.1	23	1.6							0.38	
9+10	57.3	3.63					0.97	13	22.7	23	0.8							0.52	
11	22.7	1.25					0.09	1	0.4	24	4.1							0.05	
12	43.2	3.97						9	26.4	9	5.6							0.09	
13	14.5	2.86						12	8.7	12	0.5							0.01	
14	34.9	4.71						12	14.4	42	11.5								
15	26.9	8.5						11	10.3	23	2.2								
16	65.6	3.78						11	14.2	11	6.4								
17	2.1	0.28								5	0.5								
18	66.0	2.44						7	7.6	15	3.5								
19	35.9	1.97						12	6.4	32	4.1								
20	10.9	3.16						3	1.8	16	11.4								
21	36.0	3.63						8	12.6	13	7.3								
22	209.0	2.68						2	6.0	9	0.7								
23	511.8	4.72						4	2.7	12	1.0								
24	666.2	6.53						7	30.5	1	<0.1								
25	1,352.7	4.63						19	24.7	13	4.3								
26	1,376.4	4.61	0.02	0.05				11	6.1	9	3.8		1	24.6					
27	1,227.6	3.32		0.06				6	34.1	7	59.9								
28	998.4	2.76						1	13.0	5	0.8								
29	1,859.0	2.63	0.47	0.27				21	8.7	7	4.3				0.10				
30	2,388.0	4.1	0.34	0.12				12	46.2	10	0.3								
31	1,093.1	3	0.21	0.09						12	16.2								
32	1,850.1	3.99	0.02	0.20			0.14	1	16.8	6	0.7				0.01				
33	2,588.2	1.07	0.55	0.14				1	15.6	8	87.2				0.10				

XU	Shell	Non-Human Bone	Crab	Sea Urchin	Cuttlefish	Human Bone	Charcoal	Ceramic Sherds		Stone Artefacts		Worked Bone	Worked Shell		Land Snail Shell	Foraminifera	Pumice	Termite Larvae Husks	Seeds (Other than Modern Grass)
	g	g	g	g	g	g	g	#	g	#	g	g	#	g	g	g	g	g	g
34	2,593.9	1.46	0.61	0.11				1	0.2	3	0.8	0.09							
35	804.0	4.61	0.32	0.62			0.43								0.10				
36	367.0	0.95	0.81	0.06			0.11			11	1.2				0.04				
37	306.4	1.26	0.33	0.26						3	0.2				0.03				
38	224.9	0.5	0.22	0.03						4	0.9				0.03				
39	197.2	0.73	0.24	0.01						6	3.2				0.01				
40	145.4	4.23	0.32	0.01						8	0.9				0.05				
41	236.6	4.71	0.23	0.20				1	0.4	1	0.1				0.07				
42	213.4	4.97	2.85	0.07						3	0.1				0.04				
43	345.1	2.82	0.21							12	4.7				0.03				
44	315.3	4.64	0.27	0.02				1	0.2	11	4.4				<0.01				
45	425.9	1.75	0.14							12	0.3				0.02				
46	218.0	3.21	0.79	0.19						4	0.3				0.11				
47	308.6	3.22	0.16							6	1.2				<0.01				
48	886.1	9.33	1.78	0.01						5	0.2		1	0.2					
49	415.0	7.06	1.87	0.06						10	0.3		1	<0.1					
50	588.0	7.02	0.68							10	0.4								
51	1,017.1	9.45	0.40							6	1.4						0.12		
52	2,259.6	76.16	1.73							12	0.7								
53	2,477.9	38.76	3.71				0.04			5	1.9				0.02		0.09		
54	1,299.0	15.18	8.25			0.60				5	3.2				<0.01		0.01		
55	1,857.4	22.5	3.95							13	86.0		1	0.1			6.08		
56	1,568.9	23.64	3.18							5	3.7				0.11				
57	1,280.3	18.39	1.15							13	0.9								
58	1,355.7	39.58	2.23							10	0.8				0.02				
59	1,979.1	74.56	15.43				0.09			10	0.8				<0.01				
60	1,352.8	8.44	3.25							8	4.6						0.29		
61	1,706.3	29.97	7.17							11	0.9		1	0.4			0.01		
62	87.5	40.4	0.25				0.59												
63	1,143.7	39.47	10.63							7	20.5								
64	1,780.2	30.52	30.51				0.07			10	121.0		1	0.9					
65	1,601.1	22.37	16.05							6	0.3						0.07		
66	2,684.8	48.57	101.43				0.10			11	23.4		1	0.2	0.01	0.01	0.06		
67	1,100.4	8.16	28.54				0.15			6	5.5				<0.01		0.05		
68	178.0	0.31	2.30							1	<0.1								
69	638.9	7.73	7.70							3	<0.1				0.12		1.85		
70	700.8	6.3	7.25							6	1.1				<0.01				
71	336.4	3.75	2.63							2	14.7				<0.01	0.05			
72	261.4	5.78	3.30				0.03			4	0.4					0.01			
73	159.9	6.77	8.85							6	0.4				0.01	0.01			
74	111.7	5.53	5.95				0.19			2	1.6								
75	115.9	20.15	3.24				0.28			7	1.8				0.01				

XU	Shell	Non-Human Bone	Crab	Sea Urchin	Cuttlefish	Human Bone	Charcoal	Ceramic Sherds		Stone Artefacts		Worked Bone	Worked Shell		Land Snail Shell	Foraminifera	Pumice	Termite Larvae Husks	Seeds (Other than Modern Grass)
	g	g	g	g	g	g	g	#	g	#	g	g	#	g	g	g	g	g	g
76	64.7	4.34	3.70				0.05			4	0.2						0.61		
77	53.6		2.18				0.04			3	0.3								
78	47.0	3.11	4.29				0.95			5	0.2					0.01	0.08		
79	41.3	1.09	2.16				0.22			6	0.8					0.01			
80	70.2	2.26	3.68				0.06			5	0.2						0.42		
81	68.1	2.65	3.35				0.56			3	2.6						0.76	0.01	
82	68.0	1.82	5.48				0.61			7	1.7					0.01	2.38		
83	74.8	5.86	3.68				1.03			3	0.7				<0.01	0.01	0.24	0.01	
84	56.5	2.28	4.15				0.52			1	0.2						0.34	0.01	
85	155.3	5.48	0.99				1.08			8	0.7						0.46		
86	81.5	6.94	1.41				0.55			2	46.8						0.65		
87	57.6	9.61	3.03		1.65		0.60			5	0.3					0.01			
88	37.4	3.44	5.02				0.41			2	0.1					0.03	0.91		
89	59.0	2.33	2.80				0.30			5	0.3					0.01	0.81		
90	26.3	3.39	4.21		0.11		1.28			3	0.1								
91	48.9	1.24	3.22		0.58		0.32			4	2.7				0.02	0.04	1.14		
92	27.1	3.18	2.14				0.24			1	0.2						1.42		
93	33.6	0.78	0.65				0.33			2	0.8				<0.01	0.05	0.16		
94	19.8	0.48	0.17				0.25			2	<0.1						0.18		
95	9.1	0.31	0.31	0.06						2	<0.1								
96	24.6	0.59	0.60				0.01			3	0.1								
97	13.3	0.89	0.06				0.25			5	0.2								
98	65.0	0.77	0.91							5	0.2						1.01		
99	48.7	1.79	3.14							9	99.7					0.01	0.73	0.01	
100	22.7	2.68	0.35							5	0.3					0.01	0.24		
101	49.3	1.40	1.40				0.03			2	0.5				<0.01	0.01	0.34		
102	56.2	2.24	4.53				0.36			6	0.9				0.02		0.01		
103	69.8	1.35	8.03				0.47			2	1.3					0.01	0.08		
104	49.8	3.22	4.01				0.01			3	0.3					0.01	1.31		
105	75.0	1.87	0.90	0.02			1.26			4	0.2					0.03	0.07		
106	35.7	1.99	2.99				1.23			2	0.2					0.15	0.27		
107	22.7	3.68	2.28				0.16									0.07	0.27		
108	48.8	2.61	2.25				0.41			1	0.1					0.08	0.01		
109	42.6	1.31	1.12				0.44			4	0.1					0.06			
110	78.6	4.03	0.53				0.08			4	47.3				0.01				
111	48.1	3.06	0.95				0.21			5	0.1				<0.01	0.09			
112	75.4	0.41	1.40				0.06			1	0.1					0.01			
113	31.5	1.55	2.06				0.29			2	0.7								
114	21.4	0.51	0.90												0.02				
115	21.4	0.53	4.00				0.04												
116	32.4	0.26	8.72				0.60								0.01	0.03	0.38		
117	31.5	1.13	4.64							3	1.0								

XU	Shell	Non-Human Bone	Crab	Sea Urchin	Cuttlefish	Human Bone	Charcoal	Ceramic Sherds		Stone Artefacts		Worked Bone	Worked Shell		Land Snail Shell	Foraminifera	Pumice	Termite Larvae Husks	Seeds (Other than Modern Grass)
	g	g	g	g	g	g	g	#	g	#	g	g	#	g	g	g	g	g	g
118	62.2	1.18	6.20				0.08			2	0.3					0.11			
119	12.3	0.16	1.18							1	<0.1								
120	19.1	0.58	0.19							1	0.1								
121	21.6	0.31	0.16							1	0.1				0.01				
122	30.3	0.07	0.39							1	0.1						0.03		
123	25.1	0.19	0.93							1	0.1				<0.01	0.01			
124	28.4	0.02	0.03							2	0.1								
125	19.8	0.01								1	<0.1								
126	35.5	0.25	0.31							3	<0.1						0.04		
127	29.5	0.05	0.74							1	<0.1								
128	70.8	0.08	1.27							1	0.1					0.11			
129	68.3		0.30							6	0.5								
130	65.9		1.01																
131	109.2	0.46	1.44													0.36			
132	84.8		1.29							3	0.3								
133	87.0		1.04							4	0.1					0.87			
134	159.0	0.53	2.74				0.16									1.01			

[a] Coconut shell.

Figure 2.25. General list of excavated materials by XU, Tanamu 1 Square B.

XU	Shell	Non-Human Bone	Crab	Sea Urchin	Cuttlefish	Eggshell	Human Bone	Charcoal	Ceramic Sherds		Stone Artefacts		Worked Shell		Land Snail Shell	Foraminifera	Pumice	Termite Larvae Husks	Seeds (Other than Modern Grass)
	g	g	g	g	g	g	g	g	#	g	#	g	#	g	g	g	g	g	g
1	190.1	0.21	0.82						46	22.9	13	6.4							
2	277.9	0.02						0.06	46	58.2	10	3.0							
3	1,314.0	14.87	1.87						173	311.5	129	52.5						0.48	
4	2,348.2	25.05	5.50					0.04	94	305.6	145	96.8						6.40	
5+6	2,437.2	33.19	0.81					5.41	56	183.7	30	19.2			<0.01			?	
7	190.6	2.98						0.68	11	33.3	19	6.7						1.98	
8	78.6	3.79							20	17.3	24	3.1						0.93	
9	12.1	0.74						0.13	10	10.9	21	5.4						0.32	
10	87.0	1.67						0.70	16	44.0								0.26	
11	20.5	1.92							7	13.1	6	1.8						0.01	
12	25.8	2.35							8	8.1	14	4.0						0.06	
13	15.3	2.79							10	6.9	23	12.8						0.04	

XU	Shell	Non-Human Bone	Crab	Sea Urchin	Cuttlefish	Eggshell	Human Bone	Charcoal	Ceramic Sherds		Stone Artefacts		Worked Shell		Land Snail Shell	Foraminifera	Pumice	Termite Larvae Husks	Seeds (Other than Modern Grass)
	g	g	g	g	g	g	g	g	#	g	#	g	#	g	g	g	g	g	g
14	41.5	4.39							13	6.2								0.01	
15	13.5	6.59							9	5.8	27	6.6						0.01	
16	31.7	9.27						0.16	20	10.9	32	1.8						0.01	
17	4.1	4.11							21	5.3	14	1.5							
18	19.7	3.09							21	11.5	22	0.9							
19	22.3	6.53							10	9.1	10	1.9							
20	27.2	5.94							11	5.8	18	2.8						0.06	
21	32.5	4.84							10	2.5	9	0.7						0.02	
22	125.4	7.82									22	2.0							
23	52.0	6.23						0.03	6	8.7	17	1.9							
24	298.5	6.56									18	3.5						0.01	
25	812.2	9.87	1.02	0.14					7	5.2	36	5.4							
26	400.2	5.37	0.04						25	12.8	7	0.7							
27	759.1	3.31							31	28.6	6	0.1							
28	401.9	4.04	0.21						16	13.4									
29	860.7	4.67	0.78					0.01	21	71.1	18	5.1							
30	1,892.4	4.64		0.13					29	18.7	23	1.6							
31	641.3	1.43	0.24	0.01							3	0.1			0.01				
32	1,181.7	3.28		0.37							4	2.2							
33	738.3	22.16		0.02					17	7.6	6	0.2							
34	757.4	1.90		0.02							4	0.1							
35	212.0	1.47	0.06	0.04							2	0.1			0.12				
36	285.9	2.43	0.02						2	3.3	3	0.8							
37	176.8	3.19	0.43	0.01					3	1.4	5	0.6			<0.01				
38	314.1	4.12	0.01	0.01							1	<0.1			0.13				
39	186.2	2.06	0.06	0.09			0.06	0.07	4	1.0	9	0.3			0.10				
40	223.9	3.24	1.42	0.02							5	0.3	1	<0.1	0.13				
41	194.1	5.50	0.01	0.13							18	0.5	1	<0.1	0.01				
42	270.4	5.79	0.72						3	2.2	9	0.3			0.13				
43	228.8	1.59	0.70	0.16					2	3.6	9	0.1			0.14				
44	370.4	13.29	0.55								24	1.4			0.10		0.02	0.01	
45	222.5	10.40	0.05	0.01							2	1.4			<0.01				
46	420.3	12.82	0.13	0.04							1	0.1							
47	599.6	7.76	2.89								7	2.9							
48	703.4										22	0.6			0.10		0.10	0.01	
49	977.0	8.29	0.81								5	9.1			0.01				
50	1,619.3	13.41	3.47								11	1.5			0.09		3.78		
51	1,270.7	15.45	0.71								3	0.1			0.01				
52	1,201.5	10.70	1.15								7	1.9							
53	1,549.3	34.32	1.45					0.06			3	0.3	1	0.8			1.86		
54	1,956.4	22.1	0.61								1	0.2							1.12
55	1,603.4	48.78	0.75								9	1.2	1	<0.1					

XU	Shell	Non-Human Bone	Crab	Sea Urchin	Cuttlefish	Eggshell	Human Bone	Charcoal	Ceramic Sherds		Stone Artefacts		Worked Shell		Land Snail Shell	Foraminifera	Pumice	Termite Larvae Husks	Seeds (Other than Modern Grass)
	g	g	g	g	g	g	g	g	#	g	#	g	#	g	g	g	g	g	g
56	1,282.3	17.33	1.97	0.10							14	0.7			0.07		0.71		
57	1,360.1	40.88	5.28	0.03							9	0.9	1	21.0					
58	1,457.2	14.73	4.22					0.05			12	2.2							
59	1,753.0	11.8	1.04								20	98.4			0.02				
60	1,179.8	20.34	3.31					0.07			11	0.5							
61	3,476.3	33.93	28.44								17	11.1			0.01				
62	2,816.1	238.32	18.16								18	6.3			0.03				
63	1,429.0	363.80	12.56					0.61			7	0.3			0.17	0.01			
64	2,428.7	81.50	23.37								1	<0.1			0.02		3.83		
65	1,751.4	115.34	53.44					0.03			7	71.5			<0.01		2.47		
66	3,412.2	313.07	21.22					0.08			21	4.1			0.10		0.40		
67	4,669.7	18.70	51.89	0.01				0.07			6	23.7			0.01	0.01	0.50		
68	609.8	6.29	10.36	0.39							5	0.1	1	0.6	0.02		0.02		
69	492.2	6.89	12.13					0.01			10	1.1				0.01			
70	852.0	13.68	16.54					0.22			9	2.7			0.14	0.02			
71	562.0	10.41	10.48					0.04			10	0.9	3	1.4	0.13	0.01	0.38		
72	387.1	5.38	6.71								4	54.2			0.02		0.10		
73	247.8	3.49	7.45					0.08			5	0.1			0.15		0.01		
74	179.9	4.79	6.45					0.59			17	0.5				0.03	2.32		
75	112.3	3.89	2.19								6	1.1	1	<0.1	0.01		0.65		
76	119.9	4.92	3.03								8	0.7			<0.01	0.01	0.38		
77	53.2	2.18	2.12					0.04			2	1.0			<0.01		0.30		
78	66.6	3.58	2.43					0.01							1.20	0.01	0.48		
79	118.8	1.63	6.17					0.31			11	1.1				0.01	0.25		
80	93.1	1.22	1.22					0.01			4	0.2			0.11	0.03	0.15		
81	96.6	4.19	4.85			0.06		0.04			11	0.2				0.01	0.57		
82	110.9	4.48	3.53					0.93			2	<0.1			0.01	0.03	0.17		
83	82.8	2.25	1.66					0.08			5	0.3				0.01	0.30		
84	115.8	4.36	3.81					0.03			5	0.3			0.01	0.04	0.67		
85	63.0	2.80	6.17					0.74			8	0.3	1	0.5		0.01	2.69		
86	112.2	3.17	5.32					0.15			9	2.4			0.02	0.06	0.25		
87	140.5	4.46	3.69					0.29			5	0.2			0.04	0.05	1.36		
88	122.4	1.90	4.40					0.15			8	38.9			0.01	0.04	0.99		
89	132.5	2.01	2.78					0.04			11	67.6	1	13.0		0.03	4.26		
90	75.3	3.29	5.42					0.43			14	1.0			0.12	0.01	2.22		
91	227.4	0.56	3.97					1.35			3	0.1			0.08	0.09	6.78		
92	47.8	2.43	1.68					0.29			2	1.9			0.06	0.25	4.21		
93	89.3	0.94	3.15					0.08			4	0.2			<0.01	0.08	3.57	0.01	
94	80.3	0.29	0.26					0.01			3	0.3			<0.01		0.11		
95	97.4	1.98	0.75					0.08			3	0.4			0.01	0.10	0.28		
96	46.9	1.82	0.05								1	<0.1			0.01	0.05	1.54		
97	56.8	2.65	1.65	0.04				0.01			3	<0.1			0.02	0.01	1.71		

XU	Shell	Non-Human Bone	Crab	Sea Urchin	Cuttlefish	Eggshell	Human Bone	Charcoal	Ceramic Sherds		Stone Artefacts		Worked Shell		Land Snail Shell	Foraminifera	Pumice	Termite Larvae Husks	Seeds (Other than Modern Grass)
	g	g	g	g	g	g	g	g	#	g	#	g	#	g	g	g	g	g	g
98	76.8	3.19	4.15	0.02				0.13			4	0.1				0.03	3.30		
99	54.5	2.28	0.39													0.08	0.01		
100	53.0	2.62	1.72					0.01			3	0.5			0.01	0.02	2.38		
101	59.7	2.83	0.14					0.17			3	0.3				0.04	0.60		
102	64.0	3.54	0.85								2	<0.1				0.01	0.25		
103	38.4	3.02	1.25								1	<0.1				0.05	0.32		
104	168.8	1.65	0.89	0.01	5.27			0.67			2	0.5			0.01	0.02	0.38		
105	30.7	1.88	1.05					0.01			4	0.3			0.06	0.02	0.55		
106	26.0	0.89	1.54								1	0.3			0.01	0.03	0.10		
107	31.4	1.49	2.08		0.29			0.01							0.04	0.05	1.79		
108	16.7	0.29	0.59					0.12			2	0.1				0.04			
109	31.4	0.68	0.39					0.08								0.22	0.52		
110	33.9	0.33						0.01									0.05		
111	31.0	1.81	1.65					0.03			2	0.2				0.01	0.12		
112	19.1	0.20	1.27					0.08								0.08	0.20		
113	50.0	0.10	0.95					0.01			2	0.7					0.30		
114	50.7							0.01											
115	50.6	0.13	2.15								2	1.3				0.01	0.01		
116	26.6	1.69	2.02					0.54			1	<0.1					0.01		
117	14.1	0.44	0.43																
118	38.1	0.01									2	<0.1					0.01		
119	33.4	0.40	1.96								1	<0.1					0.06		
120	65.2	0.02	0.65					0.01											
121	17.7	0.09																	
122	32.3	0.13	0.04								2	0.1					0.03		
123	30.4	0.09	1.20												0.05				
124	34.6	0.16									1	<0.1				0.01			
125	0.1																		
126	23.1	0.06	0.47																
127	39.9	0.11	0.10								1	0.1				0.04	0.01		
128	62.5	0.01	2.46													0.07			
129	15.8		1.19																
130	35.8		0.81													0.31			
131	43.6		3.11					0.01			3	0.1				2.53			
132																			
133	78.6		0.72								1	<0.1				1.13			
134	66.1		1.16																

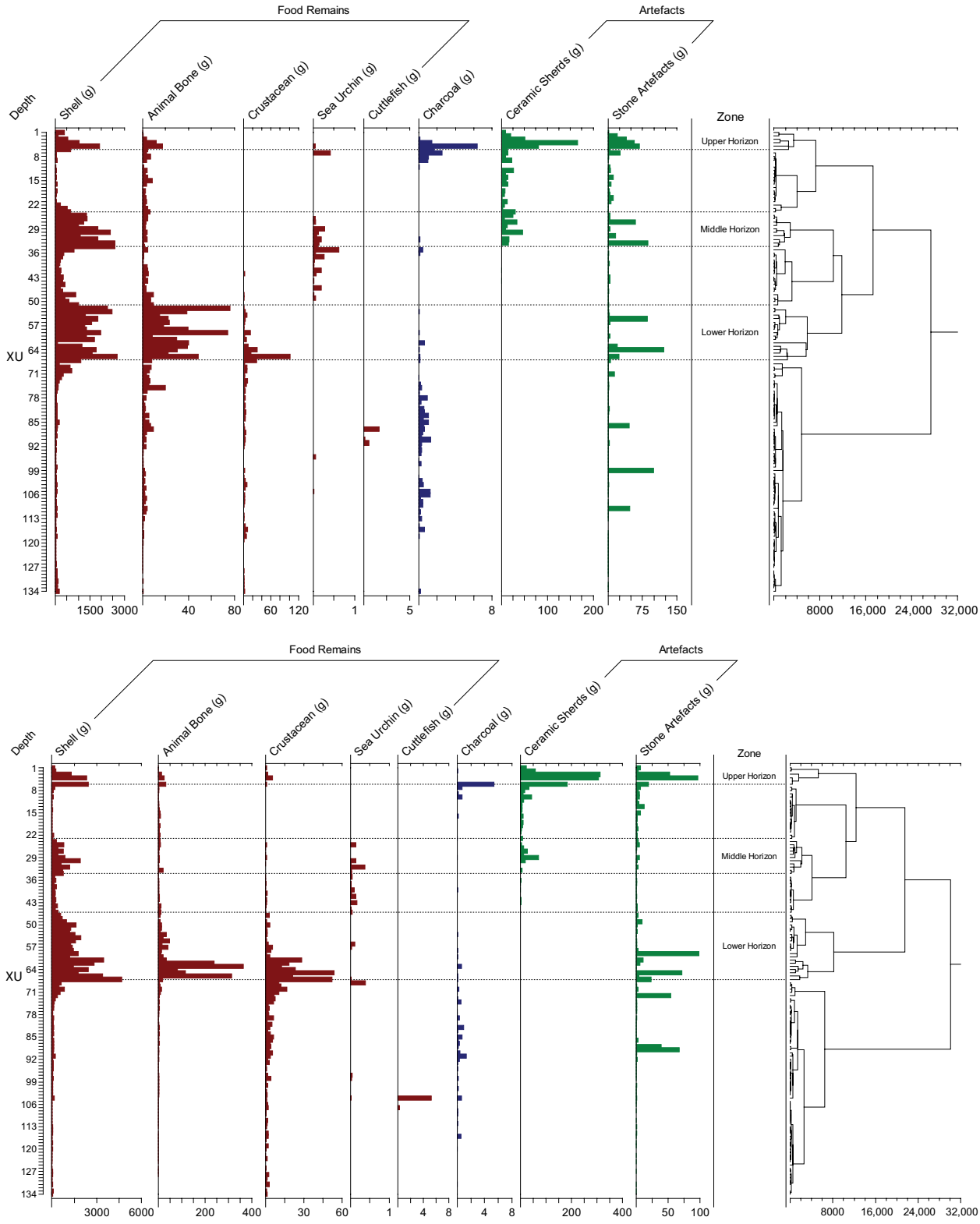

Figure 2.26. Distribution of cultural materials by XU, Tanamu 1 Squares A (top) and B (bottom).

units containing dense occupation deposits associated with former stable land surfaces, SU1, SU3, and SU5, are characterized respectively as:

- Upper Horizon (SU1, XU1–XU10), *c.* 700–100 cal BP. Ceramics are plain wares, occasionally with maker's marks, and with vessel forms similar to the ethnographic *uro*. The Upper Horizon is subdivided into: Upper Horizon A (XU7–XU10), *c.* 700–200 cal BP, corresponding to the onset of deposition of SU1; and Upper Horizon B (XU1–XU6), the densest occupation deposits of SU1 with the proto-ethnographic period age of *c.* 200–100 cal BP, probably immediately pre-dating European colonialism based on the absence of European-manufactured materials.
- Middle Horizon (SU3, XU24–XU34), 2800–2750 cal BP. The first *in situ* ceramics come from this horizon. These are all Lapita wares, and are characterized by collared and carinated vessels predominantly decorated with a narrow range of curvilinear comb dentate-stamped designs. A significant introduced mammal species, the pig (*Sus scrofa*), first appears in the record in the upper part of the Middle Horizon, shortly after the first appearance of ceramics.
- Lower Horizon (SU5, XU48–XU68), 4350–4050 cal BP. The lowermost dense occupation horizon contains abundant faunal remains and stone artefacts, and a notable quantity of worked shell, but ceramics are completely absent. The faunal evidence suggests a strong emphasis on marine resources including exploitation of an exceptionally wide array of shellfish and the regular exploitation of fish, reef crab, and turtles, the latter possibly on a seasonal basis. Despite the presence of a rich faunal assemblage in the Lower Horizon, pig and dog (*Canis familiaris*) remains are notably absent.

The cultural contents of SU2 and SU4 resulted from occasional visits to the site between major occupation periods, as well as from material that has moved slightly down or up the section from the major occupation deposits (i.e., SU1, SU3, and SU5). Thus, unlike the three major horizons described above, the cultural material in SU2 and SU4 is generally not assignable to any particular but brief occupation period (the exception being pottery that has decoration of a kind securely dated elsewhere at Caution Bay). They are instead identified to much broader temporal ranges, spanning 2050 years for SU2 and 1250 years for SU4, making them less useful for cultural sequence-building. Nevertheless, the sparse material in SU2 and SU4 does contribute to the understanding of the occupation history of Tanamu 1.

While some of the cultural material in upper SU6 has possibly moved down a short distance from the major occupation deposit of the Lower Horizon (SU5), cultural material concentrations throughout SU6 probably represent small-scale, short term occupations of the site area during a period of rapid dune building when the fronting coastline was more open than it is today, and largely or totally devoid of mangroves. The small quantities of cultural material in SU7 are the result of episodic minor occupations on fore-dune sediments proximal to high tide level that characterized the excavated site area *c.* 5000 cal BP.

Archaeological evidence of human occupation at Tanamu 1 extends to the deepest excavated levels of SU7. It is unknown if this basal cultural evidence overlies unexcavated earlier cultural deposits at deeper levels. If so, the lower SU7 sediments would indicate intertidal beach deposits at the time of such earlier occupation.

The excavation shows that a Lapita settlement was established around 2800 cal BP at Tanamu 1, disappearing around 50 years later but continuing some 140m to the NNW at Bogi 1 where a contemporaneous Lapita village or, more likely, extension of the same village site already existed. At Bogi 1, occupation by Lapita ceramicists continued for a further *c.* 150 years after the abandonment of Tanamu 1, until *c.* 2600 cal BP when here too the village was abandoned (McNiven *et al.* 2012a).

The specialist chapters to follow (Chapters 3–7) present the full material record of human occupation at Tanamu 1, and discuss details of cultural practices relating to each occupation horizon.