Neolithic and Bronze Age occupation at Meadowend Farm, Clackmannanshire: pots, pits and roundhouses

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LIST OF ILLUSTRATIONS

1. ABSTRACT

The excavations at Meadowend Farm, Clackmannanshire produced evidence for occupation at various times between the Early Neolithic and the Middle to Late Bronze Age. Significantly, it yielded the largest and best-dated assemblage of Middle Neolithic Impressed Ware yet encountered in Scotland, comprising at least 206 vessels. Episodes of Early to (pre-Impressed Ware) Middle Neolithic activity were represented by pits and post holes scattered across the excavated areas, some containing pottery of the Carinated Bowl tradition and some with charred plant remains; three blades of pitchstone and one of non-local flint were also found. The phase of activity associated with the Middle Neolithic Impressed Ware pottery (*c* 3350–3000 cal BC) is represented mostly by clusters of pits, some containing hearth waste and/or charcoal, charred cereal grain and burnt hazelnut shell fragments. A stone axehead and a broken roughout for an axe- or adze-head were associated with this phase of occupation. There then appears to have been a hiatus of activity of around a millennium before occupation resumed. One Early Bronze Age structure and pits dating to around 2000 cal BC (plus undated pits containing possible Beaker pottery) were succeeded by four Early to Middle Bronze Age roundhouses dating to *c* 1750–1300 cal BC and a large pit containing parts of at least 37 pots, and subsequently by two large double-ring roundhouses, an oval building, and ancillary structures and features dating to the Middle to Late Bronze Age, *c* 1300–900 cal BC. There is also evidence suggesting low-level activity during the Iron Age, plus two medieval corn-drying kilns. Environmental evidence indicates cereal growing from the earliest period, and local woodland management. This publication focuses on the Neolithic and Bronze Age periods and discusses the significance of this site for our understanding of these periods, and particularly for the Middle Neolithic, in Scotland.

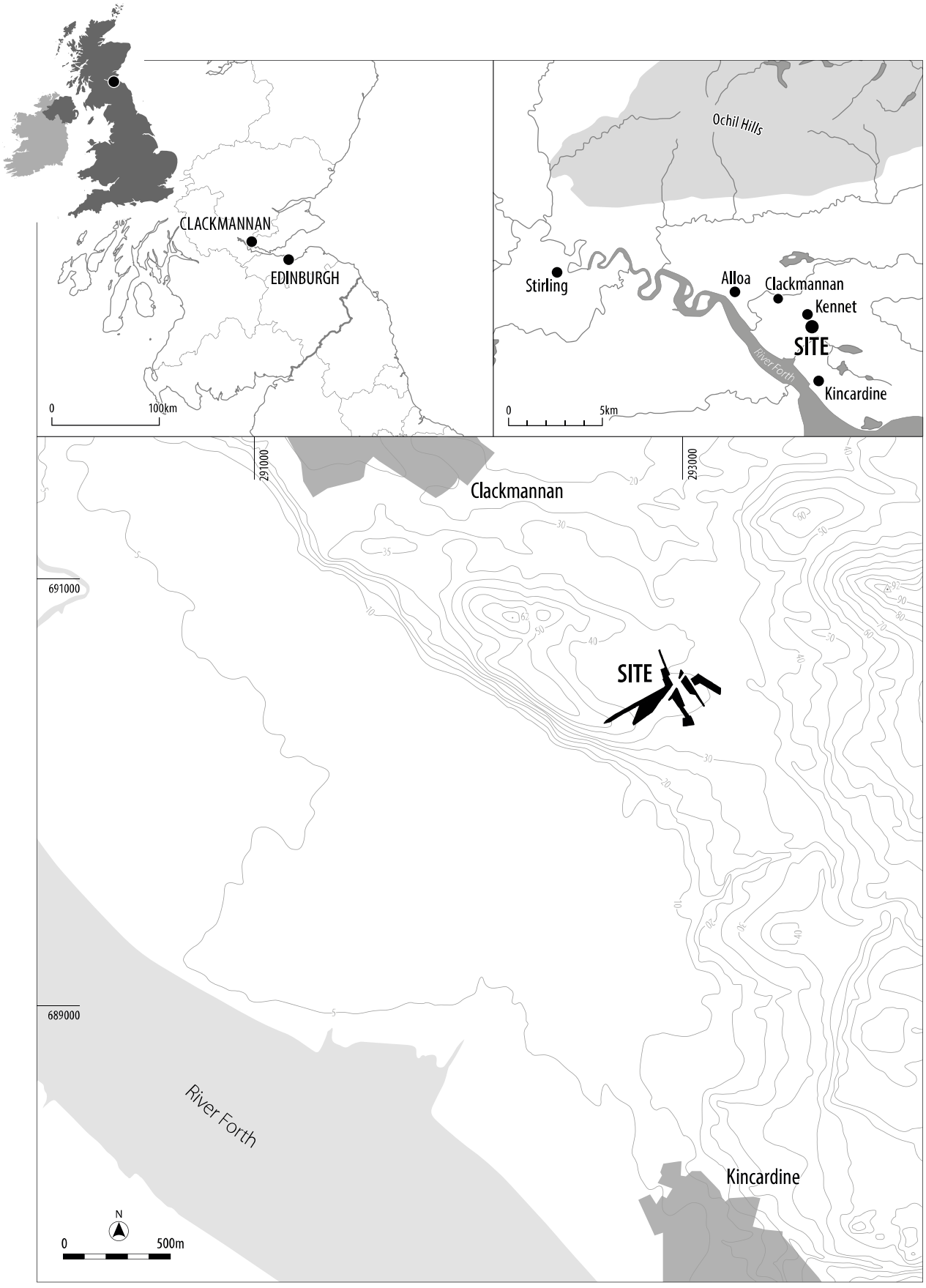
2. INTRODUCTION

Elizabeth Jones & Julie Franklin

2.1 Circumstances of the excavation

The excavation at Meadowend Farm, Kennet, Clackmannanshire (Canmore ID 47834; NGR NS 9280 9040), was carried out by a team from Headland Archaeology in early 2006, in advance of the construction of the northern approach road for the new Clackmannan Bridge. The site has alternatively been known under its project name of 'Upper Forth Crossing'. The advance archaeological works for the bridge and its associated approach roads both north and south of the Forth began in 2005, and were funded by Transport Scotland and monitored by Historic Scotland. These comprised a desk-based assessment, an assessment of the alluvial archaeology (Lancaster 2006) and evaluation of a 10% sample of the proposed land take. The evaluation sample equated to approximately 10km of linear trenches on the north of the Forth and 9km on the south side, but inevitably not all the planned trenches could be excavated due to constraints outwith the control of the project, and in total 253 trenches were actually excavated in 17 fields. The final evaluation sample amounted to a length of 18km of linear trenches or a 9% sample.

The evaluation revealed features of prehistoric and medieval date near Meadowend Farm, at the northern end of the scheme (Atkinson & Jones 2006). Following this discovery, further work was commissioned by Transport Scotland to open larger areas for full excavation of the areas of potential within the limits of the road corridor (Jones & Atkinson 2006). The areas available were limited by the presence of an old railway line, a road and overhead electricity lines, all of which had to be excluded from the excavation. An additional area was also excavated for the diversion of an existing gas pipeline. These constraints led to the rather fragmented areas shown on Illus 1 & 3; the three main zones are referred to as Field 1 (east of the modern road), Field 2 (between the road and the railway line) and Field 3, west of the railway line (Illus 1 & 3). The site at Meadowend Farm covered *c* 4 hectares in total and was excavated in generally dry winter conditions (apart from snow) to a fixed seven-week schedule. The archive and Data Structure Reports (Atkinson & Jones 2006; Jones & Atkinson 2006) for the evaluation and excavation work have been lodged in the National Monuments Record for



Illus 1 Site location. OS data © Crown copyright and database right (2017)

Scotland; the finds are in the National Museums Scotland collections, having passed through the Treasure Trove system.

This publication describes the excavation of the Neolithic and Bronze Age features discovered near Meadowend Farm. Two medieval corn-drying kilns were also discovered during the excavations but these are not reported upon here. Work was also undertaken at the nearby site of the late 17th-century Garlet House (Canmore ID 48314), the results of which were published in the *Tayside and Fife Archaeological Journal* (Atkinson et al 2009). No other significant finds were made along the route of the approach roads.

2.2 Landscape context

The site was located between Kincardine and Clackmannan, on the northern bank of the Forth estuary. It lies on a plateau of higher ground at an altitude of *c* 35m on raised marine deposits over a solid geology consisting of Carboniferous coal measure formations. The plateau, an early Holocene raised beach, overlooks carse land and now lies over 2km away from the modern coastline. However, alluvial assessment of the carse lands as part of the evaluation phase, which included a study of scientific literature and a series of boreholes along the road line (Lancaster 2006), showed that sediment accumulation there dates from the Mesolithic onwards, and the present-day carse lands would have been intertidal in very early prehistory. By the Middle Neolithic period, the area to the south of the site would have consisted of mud flats, with the emergence of land surfaces to form high salt marsh occurring over the Middle Neolithic and Chalcolithic periods (4650–3850 uncal BP, ibid; after Robinson 1993; Barras & Paul 1999). High salt marsh lies between the mean sea level and mean high water spring tides, so would be flooded regularly. Full terrestrialisation of these land surfaces is thought to have occurred between the Middle Bronze Age and Early Iron Age, but there is little or no evidence for permanent settlement on the carse lands prior to the 18th century, when drainage schemes were undertaken on a large scale. These reclaimed the regularly flooded 'saltgrass' through the refurbishment of old sea walls, the construction of new banks to keep out the high tides, and the cutting of drainage channels (OSA 1795: vol 14, Clackmannan, 611–12).

The plateau on which the site was discovered was known in the 19th century as the 'dryfield' in contrast to the regularly inundated carse lands below it (NSA 1845: vol 8, Clackmannan, 121), and although the dryfield consisted of 'hard, cold till' (ibid: 131) it was widely under cultivation and subject to massive drainage schemes at that time. One Thomas Ritchie won the Clackmannanshire Society prize for draining by laying 73 miles of tile drain in two years, although the *NSA* notes that furrow drainage (using the furrows of rig and furrow to channel water off the fields) was also very widely employed on the dryfield.

2.3 Soils

The site was still under arable cultivation at the time of excavation. The soil profile consisted of a clayey silt ploughsoil up to 0.4m deep, over a B-horizon of reddish-brown silty clay 0.2–0.4m thick, with a glacial till subsoil. The B-horizon is interpreted as a deep agricultural soil formed as the result of rig and furrow cultivation, followed by a change to shallower modern cultivation of the upper 0.4m only, which produced the upper ploughsoil. The features were generally not visible in the B-horizon because of natural soil processes which have occurred through the millennia since the features were cut, but became visible only where they cut into the glacial till, so at least 0.5m has been lost from the upper part of most of the features. The glacial till was mixed, with patches of clay, sand and gravel. A sandy silt deposit in Field 2 (C2320, Illus 11 & 12) beneath the B-horizon appeared to be a localised deposit filling a natural depression; a number of the features in Field 2 had been cut through this material (Illus 2). A series of slots were excavated through it but no features were found beneath it. A ground stone axehead (F32, Illus 25 & 26) was found on the surface of the deposit. A layer of colluvial silty sand was identified beneath the B-horizon in the eastern part of Field 3, where the ground surface sloped downwards from west to east. A number of features had been cut through this material, which was subsequently removed by machine, but again no features were identified sealed beneath it.

Illus 2 General view of excavations. © Headland Archaeology

2.4 Archaeological background

Prior to the evaluation, there was no known archaeology on the site itself, and little is known in the immediate area. Finds of probable Bronze Age cists and urned deposits of cremated remains ('stone coffins and urns') have been reported during sand and gravel quarrying less than a kilometre to the east of the site at Dickson's Wood, and a little further afield at Tulliallan sandpit, including a Food Vessel from the latter (Canmore ID 74782 and 48065, respectively). Two undated cropmark enclosures have been noted about a kilometre north-east of the site (Canmore ID 48303 and 174434), but nothing further is known about these. Excavations in advance of the Alloa–Stirling railway line refurbishments between Clackmannan and Alloa uncovered evidence for Bronze Age settlement, including a possible roundhouse, pits, post holes and pottery (Mitchell et al 2010). In Alloa itself, 5km away to the north-west, there have also been finds of prehistoric material, including an Early and Late Bronze Age cemetery at Marshill (Mars Hill), discovered in 1828, in which were found two pairs of Late Bronze Age gold bracelets associated with two stone cists, and 22 cinerary urns (of both Early and Later Bronze Age types) containing cremated remains (Anderson 1883: 447–9). A further cist, containing a Food Vessel and a copper alloy awl, was found at Marshill in 2003 (unpublished; Alison Sheridan pers comm). An earlier report of a cist and eight or nine urns found 'at the head of the town of Alloa' may refer to the same area (Canmore ID 47179). A stone circle, and what sounds like a cairn with a short cist, to the west of Clackmannan were reported as destroyed in 1917 (Canmore ID 48324 and 47168). The current distribution of prehistoric finds in the area seems to owe more to the distribution of sand and gravel quarrying than to anything else, a phenomenon that has been noted elsewhere (Stevenson 1975; RCAHMS 2008: 23, fig 3.8).

Historic map evidence shows the site area to have been open arable fields from the time of Roy's map (1747–55), and the extensive evidence

of broad furrows (at 10–15m intervals) found all over the evaluated and excavated areas, along with the medieval corn-drying kilns in Field 1, bear this out. The nearest early-named settlement was that of Shanbody (or *Shambodie*), immediately to the east of the site, which first appears in the 14th century (Cross 2009: 99) and could be the township to which the corn kilns relate. However, Shanbody/*Shambodie* seems to have disappeared from the maps completely at some time between the 1780s and 1840s, and at the time of the excavation in 2006 the land belonged to Meadowend Farm, to the north of the site.

2.5 Excavated features and finds

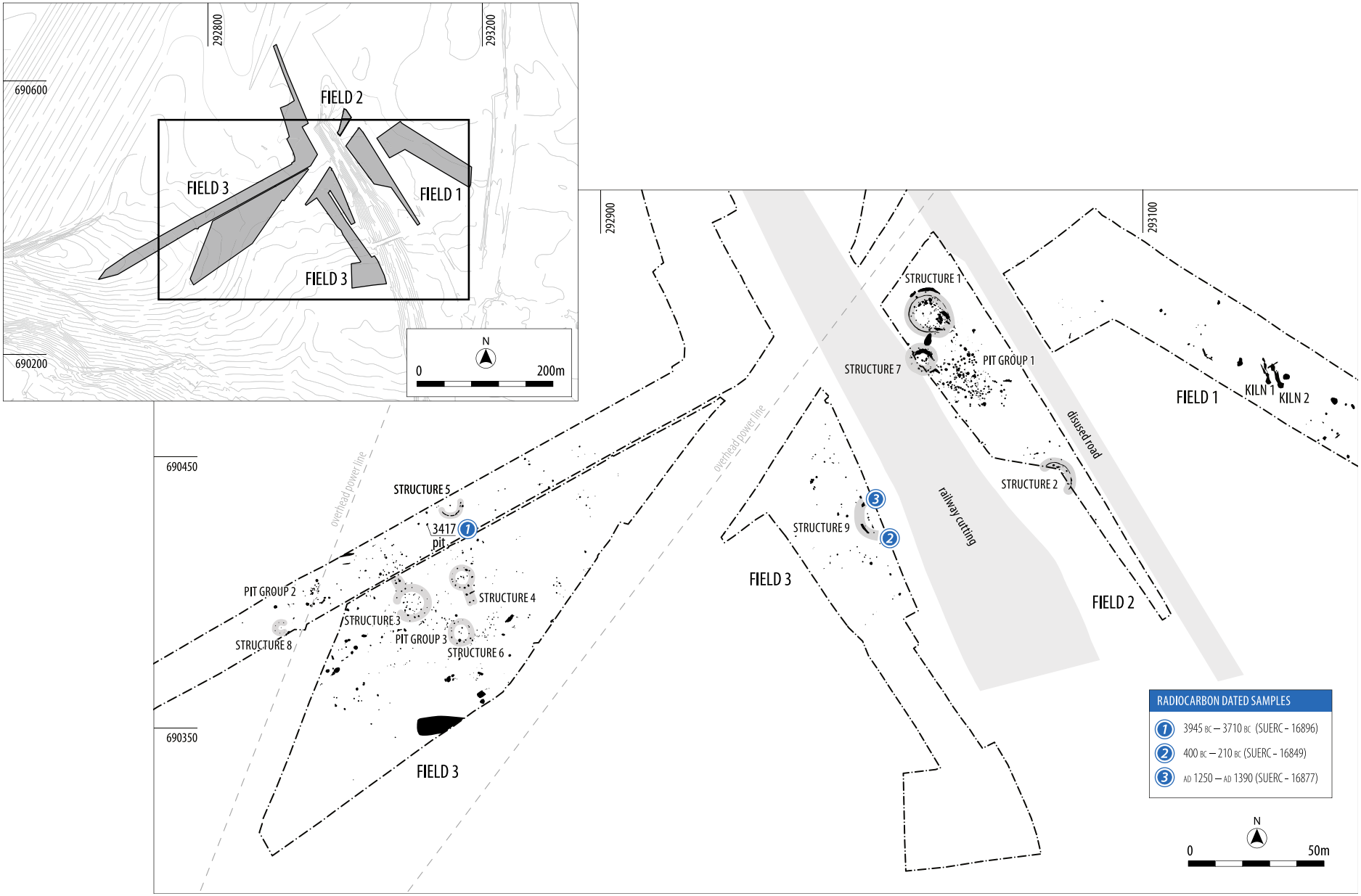
The excavated features occurred in two main concentrations, although there were isolated features scattered across the entire excavated area (Illus 3). The main concentrations were in Field 2, where Middle Neolithic Pit Group 1 and the Bronze Age roundhouses (Structures 1, 7, 14 and 2) were found, and in the central area of Field 3 where Middle Neolithic Pit Groups 2 and 3, and the Bronze Age roundhouses (Structures 3, 4, 5, 6, 8, 11, 12 and 13) were excavated. Field 3 contained some isolated features and two medieval corn-drying kilns. It was not possible to follow features beyond the limit of the road corridor, and the area below the overhead power line crossing the site from south-west to north-east was not subject to archaeological monitoring during stripping.

The lack of stratigraphy across the site has meant that the grouping of features into phases has had to rely on perceiving patterns in their size, shape, fills and spatial patterning as well as on radiocarbon dating and on chronologically diagnostic artefacts. As a result, there is inevitably a degree of subjectivity in the ordering of the evidence; the account presented here represents what we believe to be the most plausible interpretation.

Most of the excavated features contained only a single fill, usually of a sandy silt. In the interests of clarity, features are as far as possible referred to only by their cut numbers. Where features contain multiple fills which are relevant to the point in hand, these are numbered in the text, to allow cross-referencing with section illustrations. All the context numbers, whether fills or cuts, are prefixed C. These refer to cut numbers unless otherwise stated.

Artefactual finds are overwhelmingly dominated by pottery. Over 2,000 sherds, plus numerous fragments, from at least 330 vessels were found (together with one fragment of probable daub from a Middle Neolithic pit, and some pieces of burnt clay, again from a Middle Neolithic context, that may be potter's clay). The pottery weighs nearly 48 kilograms and was found in 174 contexts across the site. It spans over two and a half millennia, from the first quarter of the 4th millennium cal BC to the last quarter of the 2nd, but was unevenly distributed, both chronologically and spatially. It is dominated by Middle Neolithic vessels of the 'Impressed Ware' tradition, which date to between *c* 3300 and *c* 3000 cal BC and are distributed mostly in two concentrations of pits (Pit Groups 1 and 2). Most of the rest of the assemblage dates to the 2nd millennium (indicating a gap in ceramic deposition of around a millennium) and much of this seems to relate to three of the later roundhouses (Structures 1, 6 and 7), with a single pit located between Structures 1 and 7 producing the remains of at least 37 vessels that appear to date to the Middle Bronze Age, around 1600–1300 cal BC.

The vast bulk of the pottery came from pits, of various shapes and sizes; the rest from post holes or spreads. The different periods of pottery use can be distinguished not only in terms of the shape of the vessels, but also, to a certain extent, in their fabric, finish and manner of manufacture, and in their mode of deposition (with the Middle Bronze Age pits containing large sherds and large portions of individual vessels, unlike most of the Neolithic pits, for example). However, consistency across the millennia in the choice of crushed quartz dolerite used as a filler in the pottery (albeit crushed to different grades of fineness at different periods) suggests that the pottery was probably all made locally, since dykes of this distinctive speckled black and white (or brown) stone can be found within 10km of the site, and erratic cobbles may have been available more locally (Simon Howard pers comm). The relatively frequent presence of burnt-on organic residues on the pottery – particularly the Middle Neolithic and Bronze Age pottery – indicates that some, at least, of the pots had been used for cooking, and lipid analysis of several of the Neolithic sherds (as detailed below) has shed light on the contents of the pots. In the text below, individual vessels are indicated by the



Illus 3 Site orientation plan. © Headland Archaeology

prefix 'P'. A detailed catalogue of the pottery exists in archive form. This includes details of the 15 vessels (P316–P330) that could not be attributed to any specific period; those pots will not be discussed here.

Lithic finds, by contrast, are relatively sparse, with the Early and Early to Middle Neolithic contexts producing just four artefacts – three pitchstone blades and one of non-local flint. (A fourth pitchstone artefact, a microblade, came from an undated context, C1116.) The principal lithic finds from the Middle Neolithic features are a small stone axehead and a broken roughout for an axe- or adze-head, while the Bronze Age features produced a shale roughout for a circular object, possibly an Early Bronze Age 'napkin ring'. In the text below, these finds are prefixed by 'F'.

Plant macro-remains from the site are fairly abundant and comprise charcoal, charred hazelnut shells and burnt cereal grains; in some cases their distribution suggests areas of storage, food processing and cooking.

Due to the acidic nature of the soil, no unburnt bone was found and only a handful of burnt bone fragments, all undiagnostic as to species, was recovered.

2.6 Radiocarbon dating

A total of 43 AMS radiocarbon dates were obtained for the site. These are detailed in Table 1, where they are listed chronologically. The dates have all been calibrated using OxCal 4.2 (Bronk Ramsey 2009) and the atmospheric calibration curve for the northern hemisphere published by Reimer et al (2013). Where cited in the text all the dates are quoted to 95.4% probability, and rounded out to the nearest five years.

Bayesian modelling of the dates was not attempted on the grounds that there was almost no vertical stratigraphy and certainly no well-stratified sequences. Most of the features had single fills. Most of the dates derive from charcoal and cereal grains found within pits and post holes, and generally the dated material could not be directly related to the functions of the pits. Thus it may be impossible to prove whether the dated material found its way into the pit or post hole when that feature was created, when it ceased to be used, or at some later date (as was the case with medieval oat grains found in pits containing Neolithic pottery, as detailed below). The length of time taken for the fill of an individual pit or post hole to accumulate is unclear, so while it is assumed that dated Neolithic organics are likely to have been contemporary with the pottery found within the same features, this might not necessarily have been the case. That said, there is one example of secure dating of material found in a pit: this is a date (SUERC-16845) obtained from a carbonised barley grain, one of many found within a pit (C2368) of Pit Group 1 and presumably linked to the function of the pit. And two dates, obtained from a barley grain (SUERC-16880) and alder charcoal (SUERC-16885) associated with hearths in Structure 1, arguably date the use of those hearths.

Should others wish to undertake Bayesian modelling of the dates in the future, the contextual data presented here and in archive form should suffice to enable such analysis to take place.

Notwithstanding the reservations expressed above, the radiocarbon dates, together with the artefactual finds and a consideration of the nature and distribution of the excavated features, allowed several periods of activity to be identified, namely:

- Early Neolithic and Early to Middle Neolithic (falling within the first half of the 4th millennium BC): episodic settlement-related activity;
- Middle Neolithic (within the 34th–31st century cal BC date bracket): settlement, principally represented by clusters of numerous pits;
- Early Bronze Age (*c* 22nd–19th century cal BC): settlement activity represented by a roundhouse (Structure 5) and a series of isolated pits in Field 3;
- Early to Middle Bronze Age (within the date bracket *c* 1750–1300 cal BC): settlement activity represented by roundhouses (Structures 2, 1, 7 and 8 and associated features including a large pit containing the remains of at least 37 pots);
- Middle to Late Bronze Age (within the date bracket *c* 1300–900 cal BC): settlement activity represented by two large roundhouses (Structures 3 and 4), an oval building (Structure 6) and several smaller, possibly ancillary, structures (Structures 11–13);

Table 1. Radiocarbon dates listed in chronological order (Note: all the calibrated dates are cal BC unless specified otherwise)

Feature group/ interpretation	Feature	Context	Context description	Illus no.	Lab code	Material	Uncalibrated BP	Calibrated, 68.2% probability	Calibrated, 95.4% probability	$\delta^{13}C$ rel
Early Neolithic isolated pit near Structure 5, Field 3	3417	3418	Upper fill of pit	3	SUERC-16896	Charcoal: *Alnus* (Alder)	5025±35	3940–3870 3810–3765	3945–3710	-25.5‰
Early Neolithic pit within spread of Pit Group 2, Field 3	3975	3974	Single fill of post hole	6	SUERC-16876	Charred nutshell: *Corylus avellana* (Hazel)	4965±35	3780–3700	3905–3880 3800–3655	-25.0‰
Early Neolithic isolated pit, Field 1	2167	2166	Single fill of post hole	5	SUERC-16834	Charcoal: *Alnus* (Alder)	4750±35	3635–3555 3540–3520	3640–3505 3430–3380	-24.7‰
Pit Group 2	3927	3924	Upper fill of pit	14	SUERC-16870	Charcoal: *Corylus avellana* (Hazel)	4590±40	3495–3460 3375–3335 3210–3190 3150–3140	3510–3425 3385–3315 3295–3290 3275–3265 3240–3110	-25.3‰
Pit Group 1 (south)	2122	2140	Upper fill of pit	11, 12, 24	SUERC-16835	Cereal grain: *Hordeum vulgare* var *nudum* (naked barley)	4560±35	3370–3330 3215–3180 3160–3125	3490–3470 3375–3310 3300–3280 3275–3265 3240–3105	-24.4‰
Pit Group 2	3949	3948	Single fill of pit	14	SUERC-16875	Charred nutshell: *Corylus avellana* (Hazel)	4540±35	3360–3325 3230–3175 3160–3120	3365–3265 3245–3100	-24.6‰
Pit Group 2	3945	3944	Single fill of pit	14	SUERC-16874	Carbonised nutshell: *Corylus avellana* (Hazel)	4525±35	3355–3320 3270 3235–3170 3165–3115	3360–3260 3250–3100	-24.6‰
Pit Group 1 (west)	2308	2309	Single fill of pit	11, 12	SUERC-16890	Carbonised nutshell: *Corylus avellana* (Hazel)	4520±40	3350–3320 3275–3265 3235–3170 3165–3115	3360–3095	-26.1‰

Table 1. *cont.*

Feature group/ interpretation	Feature	Context	Context description	Illus no.	Lab code	Material	Uncalibrated BP	Calibrated, 68.2% probability	Calibrated, 95.4% probability	$\delta^{13}C$ rel
Pit Group 1 (central)	2541	2542	Single fill of post hole	11, 12	SUERC-16848	Cereal grain: *Hordeum vulgare* var *nudum* (naked barley)	4510±35	3340–3315 3295–3290 3275–3265 3235–3110	3355–3095	-24.4‰
Residual Neolithic material associated with Pit Group 1 from pit cutting ring-ditch of Structure 7	2649	2648	Single fill of pit	34	SUERC-16888	Cereal grain: *Hordeum vulgare* var *nudum* (naked barley)	4505±40	3340–3310 3295–3285 3275–3265 3240–3205 3195–3105	3360–3090 3045–3035	-23.1‰
Pit Group 1 (south-east)	2318	2319	Single fill of pit	11, 12	SUERC-16840	Cereal grain: *Hordeum vulgare* var *nudum* (naked barley)	4500±35	3335–3265 3240–3210 3195–3150 3140–3105	3355–3090	-24.5‰
Pit Group 1 (central)	2368	2369	Single fill of pit	11, 12	SUERC-16845	Cereal grain: *Hordeum vulgare* var *nudum* (naked barley)	4485±35	3330–3260 3255–3215 3185–3155 3125–3100	3345–3090 3055–3030	-24.3‰
Pit Group 1 (central)	2949	2950	Single fill of pit	11, 12	SUERC-16884	Cereal grain: *Hordeum vulgare* var *nudum* (naked barley)	4485±35	3330–3260 3255–3215 3185–3155 3125–3100	3345–3090 3055–3030	-24.0‰
Pit Group 1 (west)	2622	2623	Single fill of pit	11, 12	SUERC-16894	Cereal grain: *Hordeum vulgare* var *nudum* (naked barley)	4450±40	3325–3235 3175–3160 3120–3080 3075–3025	3340–3205 3195–3005 2985–2935	-24.4‰
Pit north of Structure 6 possibly related to activity at Structure 5	3637	3635	Fill of pit	38	SUERC-16857	Charcoal: *Corylus avellana* (Hazel)	3660±35	2130–2085 2050–1970	2140–1940	-25.9‰
Structure 5 (ring-groove)	3293	3294	Single fill of ring-groove	31	SUERC-16895	Charcoal: *Alnus* (Alder)	3600±35	2015–1995 1980–1910	2115–2100 2040–1880	-26.4‰

Table 1. *cont.*

Feature group/ interpretation	Feature	Context	Context description	Illus no.	Lab code	Material	Uncalibrated BP	Calibrated, 68.2% probability	Calibrated, 95.4% probability	$\delta^{13}C$ rel
Early Bronze Age material from ambiguous feature within spread of Pit Group 2	3904	3907	Fill of post-pipe within post hole	14	SUERC-16869	Charred nutshell: *Corylus avellana* (Hazel)	3520±35	1900–1865 1850–1775	1940–1750	-24.4‰
Pit within, but pre-dating, Structure 1	2073	2074	Single fill of pit	34	SUERC-16830	Charcoal: *Corylus avellana* (Hazel)	3380±35	1735–1720 1695–1630	1760–1610 1580–1560	-26.0‰
Structure 2 (ring-groove)	2673	2674	Single fill of ring-groove	33	SUERC-16879	Charcoal: *Corylus avellana* (Hazel)	3335±35	1680–1675 1665–1605 1585–1560 1555–1545	1735–1720 1695–1525	-26.2‰
Structure 1 (interior)	3042	3043	Single fill of post hole	34	SUERC-16887	Charcoal: *Corylus avellana* (Hazel)	3275±35	1610–1575 1565–1510	1630–1495 1480–1455	-26.0‰
Structure 7 (interior)	2570	2571	Single fill of post hole	34	SUERC-16889	Charcoal: *Alnus* (Alder)	3245±35	1605–1585 1560–1555 1545–1495 1480–1455	1610–1445	-26.2‰
Structure 8 (post-ring)	3248	3247	Upper fill of post hole	37	SUERC-16855	Charcoal: *Alnus* (Alder)	3225±35	1525–1450	1610–1580 1565–1425	-27.3‰
Structure 1 (ring-groove)	2033	2034	Single fill of ring-groove	34	SUERC-16847	Charcoal: *Corylus avellana* (Hazel)	3220±35	1520–1445	1610–1580 1560–1420	-25.2‰
Structure 1 (interior)	2638	2792	Middle fill of hearth	34, 35	SUERC-16880	Cereal grain: *Hordeum vulgare* var *nudum* (naked barley)	3140±35	1490–1485 1450–1390 1335–1320	1500–1375 1355–1300	-25.9‰
Structure 1 (interior partition)	2124	2126	Single fill of post hole	34	SUERC-16829	Charcoal: *Populus* (Poplar)	3125±35	1435–1385 1340–1310	1495–1480 1455–1290	-24.8‰
Structure 7 (ring-ditch)	2671	2672	Single fill of ring-ditch	34	SUERC-16886	Charcoal: *Alnus* (Alder)	3125±35	1435–1385 1340–1310	1495–1480 1455–1290	-26.2‰
Structure 7 (later inner post-ring)	2301	2300	Single fill of post hole	34	SUERC-16844	Cereal grain: *Hordeum vulgare* var *nudum* (naked barley)	3120±35	1435–1380 1340–1310	1490–1480 1455–1285	-24.9‰

Table 1. *cont.*

Feature group/ interpretation	Feature	Context	Context description	Illus no.	Lab code	Material	Uncalibrated BP	Calibrated, 68.2% probability	Calibrated, 95.4% probability	$\delta^{13}C$ rel
Structure 1 (interior)	2639	2991	Lower fill of hearth	34, 35	SUERC-16885	Charcoal: *Alnus* (Alder)	3110±35	1425–1380 1345–1305	1450–1275	-27.5‰
Structure 1 (interior)	2352	2437	Single fill of working hollow	34	SUERC-16846	Charcoal: *Alnus* (Alder)	3085±35	1410–1370 1360–1300	1430–1260	-25.8‰
Structure 3 (inner ring)	3356	3357	Single fill of post hole	38	SUERC-16860	Charcoal: *Corylus avellana* (Hazel)	2980±35	1260–1190 1180–1155 1145–1130	1375–1355 1300–1075 1065–1060	-24.5‰
Structure 6 (post-ring)	3699	3700	Single fill of post hole	38	SUERC-16858	Charcoal: *Alnus* (Alder)	2955±35	1225–1115	1270–1045	-25.6‰
Structure 3 (porch)	3459	3456	Post-pipe in post hole	38	SUERC-16867	Charcoal: *Corylus avellana* (Hazel)	2940±35	1215–1110 1100–1090	1260–1245 1235–1025	-27.3‰
Structure 6 (annexe)	3684	3682	Post-pipe in post hole	38	SUERC-16859	Charcoal: *Alnus* (Alder)	2940±35	1215–1110 1100–1090	1260–1245 1235–1025	-24.8‰
Structure 3 (porch)	3450	3449	Single fill of post hole	38	SUERC-16866	Charcoal: *Alnus* (Alder)	2925±35	1190–1170 1165–1145 1130–1055	1220–1015	-24.8‰
Structure 4 (post-ring)	5684	5685	Single fill of post hole	38	SUERC-16864	Charcoal: *Alnus* (Alder)	2925±35	1190–1170 1165–1145 1130–1055	1220–1015	-26.5‰
Structure 3 (outer ring)	3469	3468	Single fill of post hole	38	SUERC-16868	Charcoal: *Alnus* (Alder)	2860±35	1105–1100 1085–975	1125–920	-27.0‰
Structure 4 (post-ring)	5702	5701	Post-pipe in post hole	38	SUERC-16856	Charcoal: *Corylus avellana* (Hazel)	2850±35	1055–970 960–935	1115–920	-25.8‰
Structure 4 (post-ring)	5686	5687	Single fill of post hole	38	SUERC-16865	Cereal grain: *Hordeum vulgare* var *nudum* (naked barley)	2835±35	1040 1030–930	1110–910	-24.1‰
Structure 3 (inner ring)	3738	3739	Single fill of post hole	38	SUERC-16854	Charcoal: *Alnus* (Alder)	2820±35	1010–925	1110–1100 1090–895	-26.0‰
Structure 9	2377	2378	Single fill of post hole	3	SUERC-16849	Charcoal: *Alnus* (Alder)	2265±35	395–355 285–235	400–350 315–210	-27.4‰

Table 1. *cont.*

Feature group/ interpretation	Feature	Context	Context description	Illus no.	Lab code	Material	Uncalibrated BP	Calibrated, 68.2% probability	Calibrated, 95.4% probability	$\delta^{13}C$ rel
Structure 9	2762	2763	Single fill of ring-groove	3	SUERC-16877	Cereal grain: *Triticum aestivo-compactum* (Club/bread wheat)	705±35	AD 1265–1300 AD 1370–1380	AD 1250–1315 AD 1355–1390	-23.3‰
Intrusive medieval material within south-western outlier to Pit Group 1	2753	2752	Middle fill of pit	11, 12, 13	SUERC-16878	Cereal grain: *Avena* (oat)	575±35	AD 1315–1355 AD 1390–1410	AD 1300–1370 AD 1380–1425	-25.7‰
Intrusive medieval material within Pit Group 1 (south-east)	2318	2319	Single fill of pit	11, 12	SUERC-16839	Cereal grain: *Avena* (oat)	540±35	AD 1325–1345 AD 1395–1430	AD 1310–1360 AD 1385–1440	-25.7‰

- Early Iron Age activity: hints of low-level agricultural activity, with some structural remains that may or may not belong to this period;
- Medieval: agricultural activity, including two corn-drying kilns.

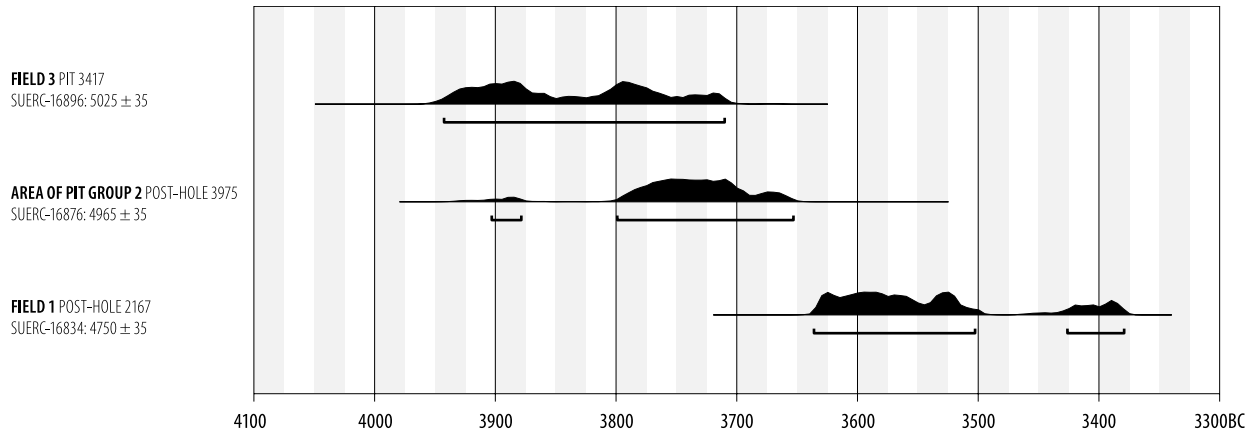
The structural, artefactual and ecofactual evidence pertaining to each of these periods (except for the last two) will be presented and discussed below. A concluding section will assess the importance of the Meadowend Farm site to our broader understanding of the Neolithic and Bronze Age periods in this part of Scotland.

3. EARLY NEOLITHIC AND EARLY TO MIDDLE NEOLITHIC ACTIVITY, FIRST HALF OF THE 4TH MILLENNIUM CAL BC

Elizabeth Jones & Julie Franklin

Several pits and post holes, scattered across the excavated area, produced artefactual and/or radiocarbon-dated ecofactual evidence attesting to activities during the first half of the 4th millennium cal BC. Other features which did not contain dating evidence were assigned to this period on the basis of spatial association; these include two small groups of post holes. At least two discrete episodes or phases of activity could be discerned, the first falling within the first quarter of the 4th millennium, and associated with Carinated Bowl pottery of its earliest, 'traditional' variant, and the second falling within the second quarter of that millennium, and associated with 'modified' Carinated Bowl pottery. Not all of the features could be assigned unambiguously to one or the other, however: as noted below, the pottery from features C2118, C2039, C2655 and C2167 could fit within either variant of the Carinated Bowl tradition, while some other features lacking artefactual finds and radiocarbon dates could similarly belong to either phase of activity.

The selection of samples for radiocarbon dating inevitably had to be a compromise between those contexts yielding suitable material (namely abundant cereal grain or a sufficiently large single piece of unabraded charcoal from a short-lived species tree), and those contexts that were of interest artefactually, stratigraphically and/or structurally. Inevitably, not



Illus 4 Early and Early to Middle Neolithic radiocarbon dates. © Headland Archaeology

all those features which were of particular interest had suitable material for dating, and even when suitable material appeared to be present, the results were not always what might have been predicted. Two pits containing Neolithic pottery (namely C2753 with modified Carinated Bowl pottery and C2318 with Impressed Ware) produced medieval dates from oat grains. The oats must have been intrusive material, probably introduced via the aforementioned plough furrows that cross this area of the site. The oat grains were deliberately chosen for dating in order to test the remote chance that this might be an exceptionally early example of oat cultivation. In fact, and perhaps not surprisingly, the oats returned medieval dates, from the early 14th to the early 15th centuries cal AD (SUERC-16839, SUERC-16878).

3.1 Early Neolithic activity

Two features produced Early Neolithic radiocarbon dates (Illus 4): an isolated pit in Field 3 (C3417, Illus 3), and a post hole located within the later, Middle Neolithic Pit Group 2 (C3975, Illus 5). Both also contained traditional Carinated Bowl pottery (respectively P1–2, Illus 7, and P3, not illus). One further pit, C2120 (Illus 6) in the northern half of Field 2, also contained traditional Carinated Bowl pottery (P4–7, Illus 7). Some post holes spatially associated with C3975 were also assigned to this phase.

The earlier of the two dates was that from pit C3417 (3945–3710 cal BC, SUERC-16896). This was an isolated pit to the south-west of Structure 5 in Field 3. The pit measured 1m by 0.7m and was 0.15m deep, and was similar to the later pits in Field 2 (C2753 and C2158), described below, in that it contained three distinct fills. The primary fill comprised black silty sand with charcoal. This was overlain by a middle fill of light red, probably burnt, sand which included a very small quantity of naked barley; and the uppermost fill was dark brown sandy silt with charcoal and burnt bone. Sherds from a carinated bowl (P1, Illus 7) and a rimsherd probably from an uncarinated bowl (P2, Illus 7) were recovered from this upper deposit, and the alder charcoal that produced the radiocarbon date came from the same context.

Post hole C3975 (Illus 5) lay in the area of the later, Middle Neolithic Pit Group 2, and contained sherds from an Early Neolithic carinated or S-profiled bowl of traditional Carinated Bowl type within the fill (P3, not illus). Charred hazelnut shell from the fill of the feature was radiocarbon-dated to 3905–3655 cal BC (SUERC-16876). No other charred plant remains or charcoal were present. The post hole formed part of an arc of small post holes (with C3937, C3935, C3977 and C3979) in the centre of the later, Middle Neolithic Pit Group 2. They were arranged in a half-circle, open to the west; a later furrow had heavily truncated one of these and had probably removed others. The post holes were generally between 0.3 and 0.4m in diameter, sub-circular and survived only up to 0.11m in depth. The fills were fairly uniform, comprising mid-brown sandy silt. No dating material was recovered from

Illus 5 Early Neolithic features and finds, Field 3. © Headland Archaeology

the other four post holes (Illus 5). It is possible that these post holes represent a small shelter, which served as the focus for the surrounding activities.

Fragments of four large bowls of traditional Carinated Bowl type (P4–7, Illus 7) were found in shallow pit C2120 (Illus 6) in the northern half of Field 2. The pit was 1m in diameter and 0.12m deep and contained some burnt sand and charcoal as well as very small quantities of naked barley and indeterminate cereal grains. A sherd of Carinated Bowl pottery (P8, not illus) was found as residual material in a medieval furrow, C2118, cutting through this feature. An edge-retouched flint blade (F6), found in a deposit overlying the pit, might also have derived from it. It was made of exotic dark flint and although this type of flint is usually considered to be of Middle to Late Neolithic date, the blade technology could indicate an Early Neolithic date.

3.2 Early to Middle Neolithic activity

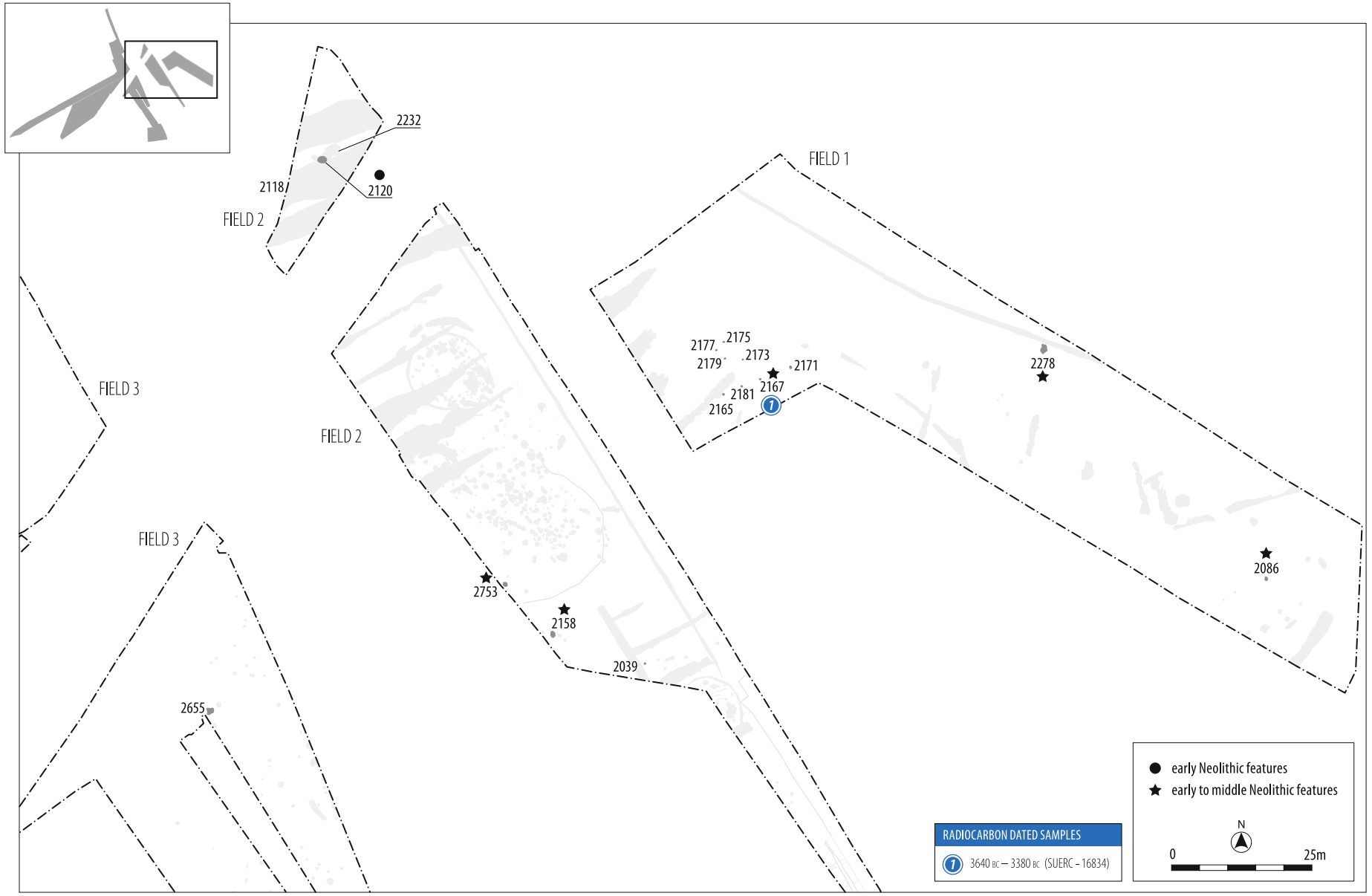
There is clear evidence for one or more later phases of activity in the centuries around 3500 BC, and this is attested by the radiocarbon-dated post hole C2167 (SUERC-16834) and by features containing Carinated Bowl pottery in its 'modified' variant.

The most coherent group of features assigned to this period is a group of small post holes on the western edge of Field 1 (C2165, C2167, C2171, C2173, C2175, C2177, C2179, C2181, Illus 6) – an area that is otherwise archaeologically 'quiet'. The post holes were broadly similar, being sub-circular in plan and between 0.2 and 0.3m in diameter and 0.1m deep. The exception was C2171, which was oval and larger, measuring 0.5m by 0.3m and was 0.3m deep. The angle of the post hole showed that the post had been pulled out towards the north-west. The fills were also generally similar and reasonably clean but post holes C2165 and C2167 contained darker fills with moderate amounts of charcoal, and the latter feature was relatively rich in artefacts and environmental remains compared with the other features of this group. Post hole C2167 was the only feature in this group to contain any radiocarbon-datable material, namely a very small quantity of emmer wheat (*Triticum dicoccum*) and abundant alder charcoal, the latter radiocarbon-dated to 3640–3380 cal BC, SUERC-16834 (Illus 4). It also contained three sherds from a single pot (P11, not illus), identified as belonging to the Carinated Bowl tradition and possibly to the later period of currency of modified Carinated Bowl pottery, as discussed below.

Two further isolated features in Field 1, pit C2278 and post hole C2086 (Illus 6), also contained modified Carinated Bowl pottery. Pit C2278 lay some 50m to the east of the group previously described. The base of the pit was burnt and it also contained a small quantity of charcoal, with burnt sand and burnt stones of various sizes. A large amount of modified Carinated Bowl pottery (80 sherds, over 1kg) was recovered from this pit, comprising parts of two large vessels (P12, P13, Illus 8) and one thin-walled, fine-textured carinated or S-profiled bowl (P14, Illus 8). Sherds from vessel P12 had been burnt after breakage, possibly indicating use of the sherds for lining a hearth or pit used for cooking. Three pitchstone blades (F8–10) were also found in the pit; the width of the blades and the use of pitchstone suggest an Early to Middle Neolithic date for these, consistent with the impression given by the pottery.

Some 60m to the south-east of this lay post hole C2086. This contained a large sherd from a deep-bellied jar attributable to the modified Carinated Bowl tradition (P15, Illus 8), in an area associated with the two aforementioned medieval kilns. The feature appeared to form part of the medieval complex and so the pottery is considered to be residual, probably originating from a Neolithic feature disturbed by the later activity.

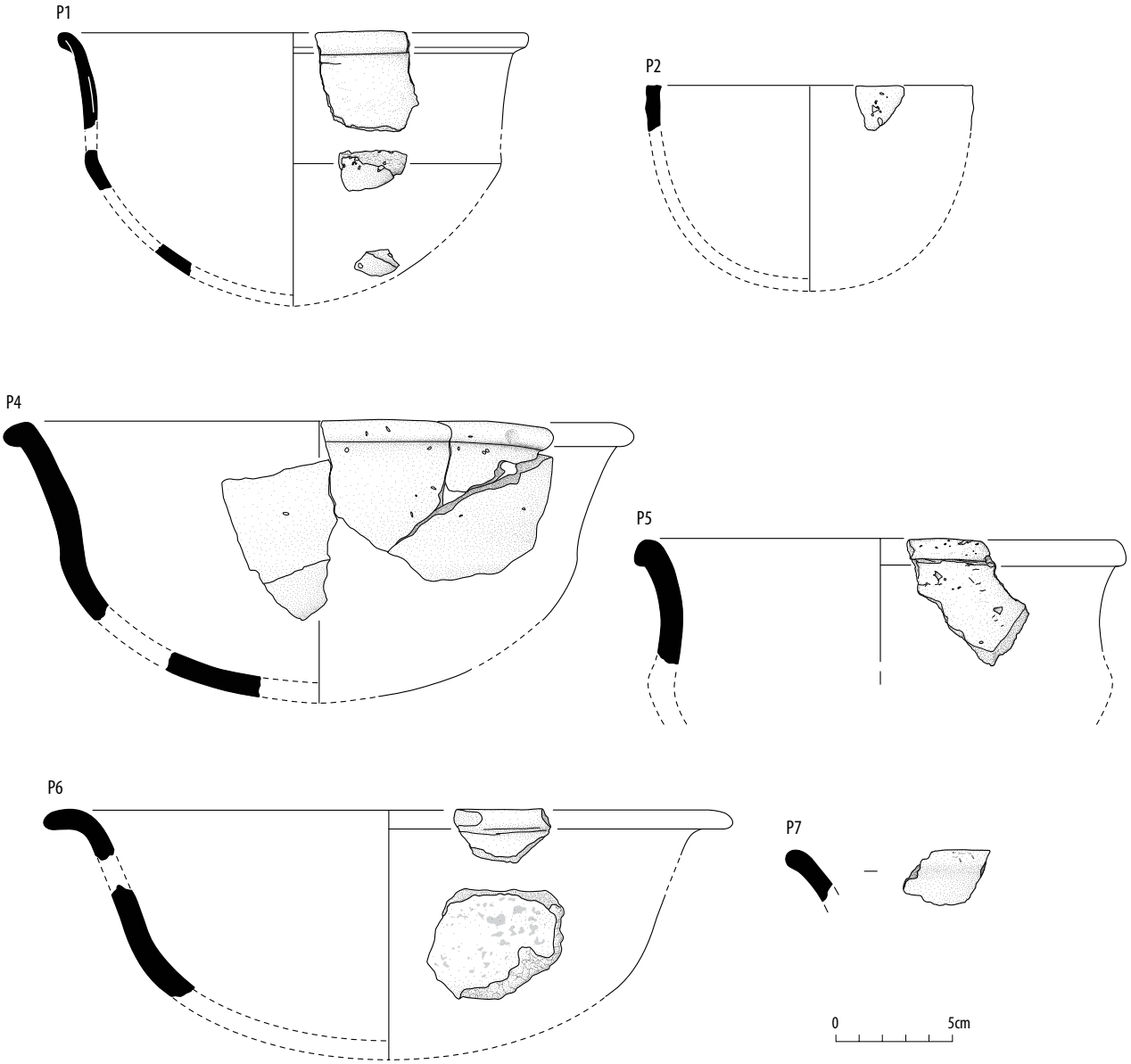
Four isolated pits belonging to this period were found to the west in Fields 2 and 3. The three pits in Field 2 (C2039, C2753 and C2158, Illus 6) were found to the south of the later, Middle Neolithic Pit Group 1 (see below). Pits C2753 and C2158 (Illus 6 & 11) each contained three layers of deposits, similar to those found in Pit Group 1. In both cases a blackish-brown layer with charcoal and burnt stones had been covered by a layer of gravel or redeposited natural sediment. Large fragments from a single lugged cooking jar of modified Carinated Bowl type (P16, Illus 9) were found laid on the base of the middle black silty fill (C2752) of pit C2753 (Illus 12 & 13a) and within the primary black silty fill and upper fill of pit C2158. This suggests that these two pits may have been filled in during the same episode of activity. Pit C2753 also contained



Illus 6 Early and Early to Middle Neolithic features and finds, Fields 1 and 2. © Headland Archaeology

fragments from at least four other vessels of modified Carinated Bowl type, including two other large cooking bowls or jars (P17, Illus 9, P18, not illus) and two bowls (P19, P20, Illus 9). Unfortunately some intrusive material had also found its way into this pit, namely the medieval oat grain discussed above (SUERC-16878). The grain is assumed to have penetrated from the overlying ploughsoil into the exposed portion of the middle fill (C2752, Illus 13a). The pit also included abundant quantities of naked barley and some emmer wheat as well as a large quantity of burnt hazelnut shell. While some of this might also be intrusive, the naked barley is consistent with a Neolithic date and is very unlikely to be medieval. Pit C2039 contained a single small featureless sherd of fine pottery. The fineness of the fabric suggests it belongs to the Carinated Bowl tradition but it cannot be more precisely dated.

Finally, further to the west in Field 3, isolated pit C2655 (Illus 6) was filled with a charcoal-rich dark silt and contained a sherd from a vessel that could be of either traditional or modified Carinated Bowl type (P10, not illus). The pit was 0.34m in diameter and 0.17m deep, and later disturbance is indicated by the presence of a broken thin double-edged iron blade, possibly part of a piece of farm machinery. This may be related to the presence of furrows in the area.



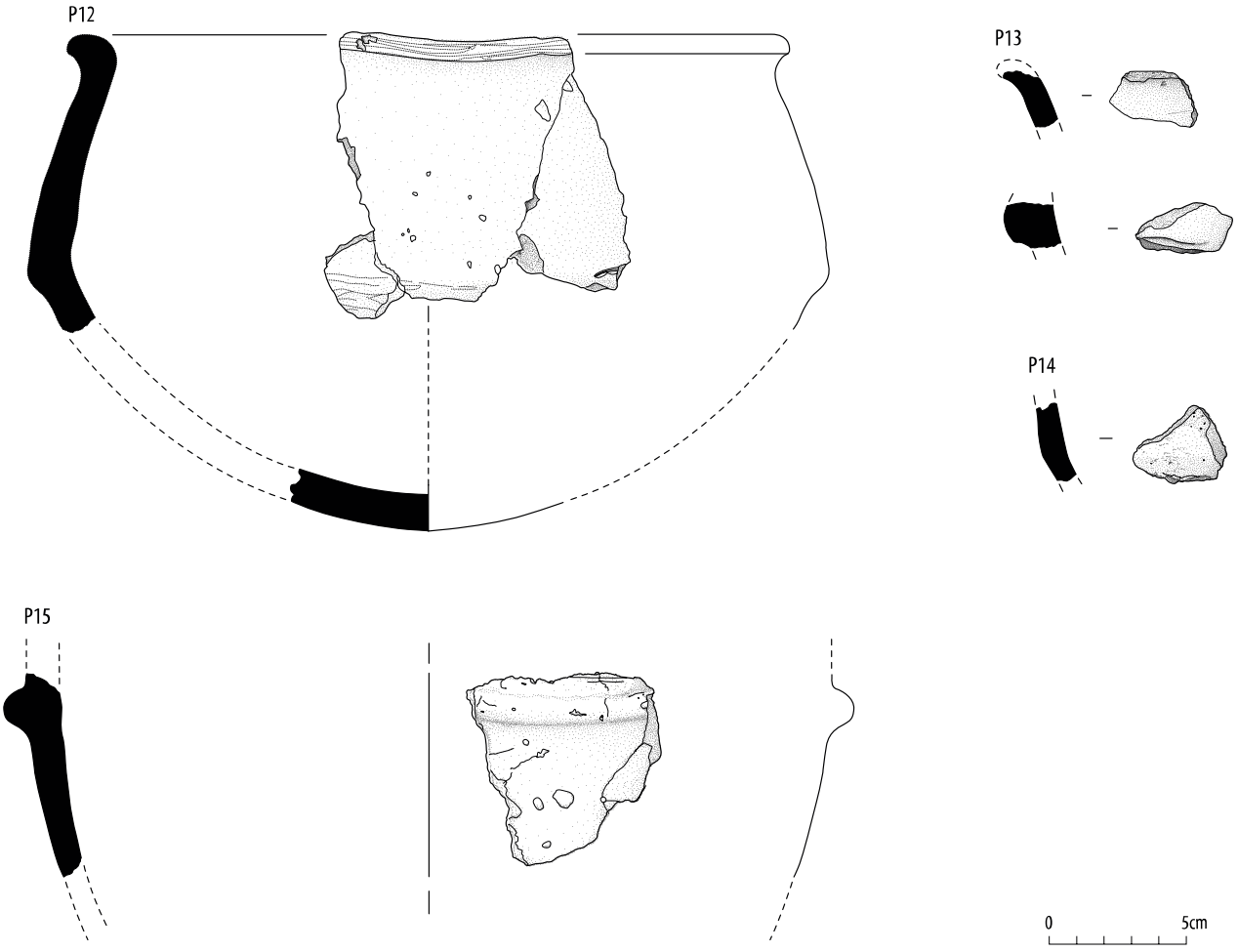
Illus 7 Traditional Carinated Bowl pottery: Pots 1–2, 4–7. © Headland Archaeology

3.3 The Early Neolithic and Early to Middle Neolithic pottery

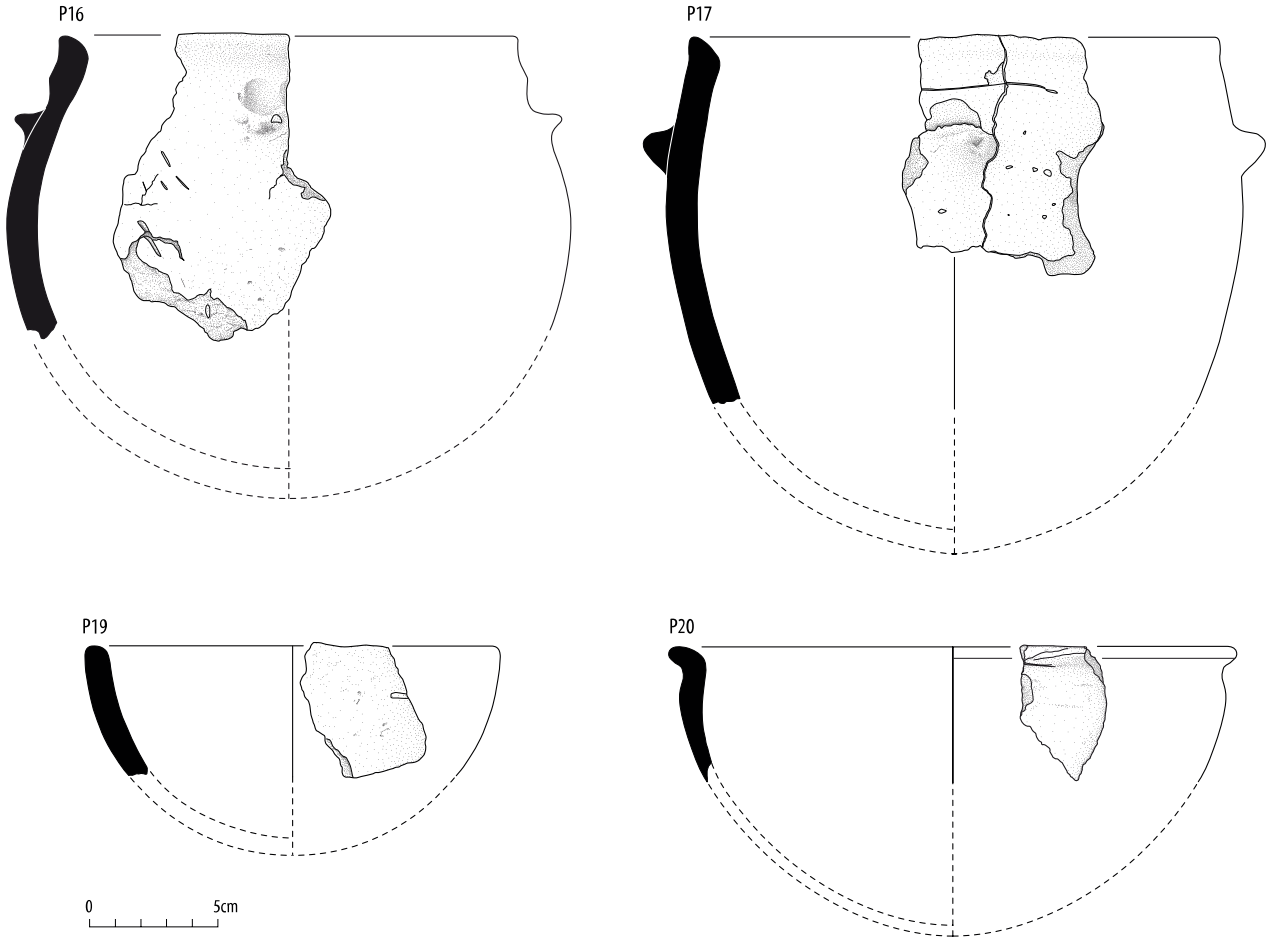
Alison Sheridan

Parts of 20 pots belonging to the Carinated Bowl (henceforth CB) tradition were found scattered across the site in eleven features (Illus 5 & 6). All are undecorated and round-based; some had been used as cooking vessels and many had been burnt. Definite examples of traditional CB pottery (P1–7, Illus 7) – the earliest expression of this ceramic type – came from pits C2120 (Illus 6), C3417 (Illus 3) and post hole C3975, Illus 5), the last two being radiocarbon-dated to 3945–3710 cal BC and 3905–3655 cal BC respectively (SUERC-16896 and 16876). The vessel forms comprise gently carinated and S-profiled bowls with simple, gently everted rims, slightly splaying necks, and shallow to medium-depth bellies. Rim diameters vary from *c* 195mm (P1) to 290mm (P6). One small uncarinated bowl (P2) is also represented among the material from pit C3417. All these vessels are characteristic of traditional CB pottery as found elsewhere in Britain and Ireland (Sheridan 2007a). They include some very thin-walled vessels (with P1 and P3 being as thin as 5.3mm and 4.9mm respectively over part of their body) and they are generally fine-textured, with carefully smoothed surfaces and sparse, mostly small stone inclusions. The stone type used for the pot filler is the locally available quartz dolerite, as mentioned above. One particularly characteristic feature of traditional CB pottery is seen in P4, where the wall narrows slightly above and below the carination.

Modified CB pottery represents a stylistic and technical drift from this initial, homogeneous tradition of pottery manufacture (while the choice



Illus 8 Modified Carinated Bowl pottery: Pots 12–15. © Headland Archaeology



Illus 9 Modified Carinated Bowl pottery: Pots 16, 17, 19 and 20. © Headland Archaeology

of stone used as a filler remained the same). Pots P12–P20 (Illus 8 & 9) fall within this category. Vessels P12–P14 were all found in pit C2278 (Illus 6). P12 constitutes a variation on the carinated bowl form, having a bulging and slightly inturned long neck and shallow belly, and relatively thick and slightly uneven walls. P13 offers another variant, where one or more lugs has been added to the carinated bowl vessel shape. Vessels P15, from post hole C2086 (Illus 6) and P16, 17, 18 and 20, from pits C2753 and C2158 (Illus 6 & 11) differ more radically from the traditional CB canon. P15 is a very large (possibly as much as 350mm in belly diameter), coarse, deep-bellied vessel with a prominent cordon, while the other pots are deep-bellied globular cooking pots, two of which have crude lugs on their upper body. In addition, one large, simple, open, uncarinated bowl (P19) accompanied the jars in pit C2753. The variability in this modified CB pottery from across the site suggests that it may well relate to discrete episodes of activity at different times between the 37th and 34th centuries cal BC. The material from pits C2158 and C2753 appears to be contemporary. The features were within 12m of each other and both contained sherds of the same pot (P16).

Some pottery (P8–P11, not illus) has been classified as 'traditional or modified CB' on the grounds that it could fit within either repertoire. The change from traditional to modified CB seems, in some parts of Scotland, to have involved a gradual shift over the generations within a pottery-making tradition (although in north-east Scotland the process seems to have occurred more rapidly: Sheridan 2007a). This 'style drift' can be seen in the material from the aforementioned pit C2278, where P14, a thin-walled, fine-textured,

gently carinated or S-profiled vessel, could pass for traditional CB pottery if found on its own. Confirmation that thin-walled, fine-textured carinated bowls were still being made some considerable time after the CB tradition was introduced to Scotland is arguably provided by the date of 3640–3380 cal BC (SUERC-16834) associated with P11, which represents one such bowl, with a black and possibly slightly polished exterior surface. The absence of such vessels from the features that contained P15–P20 suggests that these may belong to the later part of the currency of modified CB use. However, given the small size of the CB assemblage overall from Meadowend Farm, such a claim can only be tentative.

3.4 Lipid analysis of one of the Early/Early to Middle Neolithic sherds

Lucy Cramp & Alison Sheridan

In order to investigate the former contents of some of the pottery from Meadowend Farm, 27 samples of CB and Impressed Ware pottery were subjected to absorbed lipid analysis at Bristol University, using the method described in Cramp et al (2014). This work was undertaken as part of a broader, NERC-funded project investigating the contrast between Neolithic and Mesolithic diets in Britain (NE/F021054/1). Of the six CB sherds analysed, only one (P4 from C2121, sample code UFC 4) produced evidence for absorbed lipids, and this revealed the presence of ruminant dairy fat, that is, milk-derived fat. This discovery is in line with results for virtually all the other CB pottery analysed in Britain (ibid), and demonstrates once more that Scotland's early farmers were dairy farmers, exploiting their domesticated cattle not only for their meat but also for their secondary products. The sample size was too small to ascertain how important a part of the economy and diet this was. While there is a very strong probability, by analogy with other analysed Neolithic individuals across Europe, that the pot's users would have been lactose intolerant (Curry 2013), they would have been able to digest milk in processed form, for example as yoghurt, butter and cheese. Thus, in theory, butter could have been used in cooking.

3.5 Early to Middle Neolithic stone artefacts

Torben Bjarke Ballin

The assemblage of stone finds was small and only three or four lithic items could be ascribed to this period. However, they were unusual in that all were made of imported material. Three pitchstone blades (F8–10, not illus) were found in pit C2278 (Illus 6), an isolated pit on the edge of Field 1 containing several vessels of modified CB type. The use of pitchstone from the Isle of Arran in the Firth of Clyde is largely limited to the Neolithic period outside of Arran itself (Ballin 2009; Ballin & Faithfull 2009; Ballin 2015), and the form of these blades suggests that the pit falls towards the latter end of this early period, an impression reinforced by the associated pottery. (A fourth pitchstone artefact, a microblade, was found in the fill of a ditch or slot, C1116.)

An edge-retouched blade (F6, not illus) made of exotic dark flint was found in hearth waste C2232, lying close to Carinated Bowl pottery in Field 2 (Illus 6). The flint was possibly imported from north-east England (Saville 1994: 63), though a source further afield cannot be ruled out. While the blade technology is consistent with Early Neolithic knapping practices, such flint is more often associated with Middle and Late Neolithic material (eg Ballin 2011) and its dating here, with no finds directly associated, is unclear. Indeed, one cannot rule out the possibility that it had been associated with the Middle Neolithic activity on the site.

3.6 Charred plant remains from the Early Neolithic and Early to Middle Neolithic features

Scott Timpany, Sarah-Jane Haston & Laura Bailey

Charcoal was found in the Early Neolithic pits C3417 and C2120, and in the Early to Middle Neolithic post holes C2165 and C2167 and pits C2278, C2753, C2158 and C2655. Alder charcoal was present in pit C3417 and post hole C2167. Other charred plant remains comprise grains of naked barley (found in Early Neolithic pits C3417 and C2120 and in Early to Middle Neolithic pit C2753), of emmer wheat (of which a small amount was found in Early to Middle Neolithic post hole C2167 and pit C2753), of an indeterminate crop (in pit C2120), and of oat grains (in Early to Middle Neolithic pit C2753). As noted above, however, it

was clear from radiocarbon dating (SUERC-16878, cal AD 1300–1425) that the oat grains are intrusive, being medieval in date.

Charred hazelnut shells were found in Early Neolithic post hole C3975 and Early to Middle Neolithic pit C2753. Those in C2753 were abundant, comprising 389 fragments (12.3g), and it may be that the pit had been used for roasting hazelnuts. Hazelnuts are a well-known foodstuff and are a common find on Neolithic sites across Scotland and elsewhere in the UK (eg McComb & Simpson 1999; Barclay et al 2002; Bishop et al 2009). The practice of roasting hazelnuts is known from at least as early as the Mesolithic period in Scotland (eg Mithen et al 2001) but it is likely to have continued throughout prehistory and indeed two such roasting pits may be associated with Bronze Age Structure 6, discussed below. The smaller quantity of six hazelnut shell fragments found in C3975 returned a date of 3905–3655 cal BC (SUERC-16876), and the dating of other hazelnut shell from elsewhere on the site covers the range of dates from the site. The possible roasting pit itself was dated by the modified CB pottery within it to the Early to Middle Neolithic.

3.7 Discussion and synthesis of the evidence for Neolithic activities during the first half of the 4th millennium cal BC

Alison Sheridan, Elizabeth Jones & Julie Franklin

In comparison to the abundant pits and pottery of the Middle Neolithic, the evidence for human presence at Meadowend Farm during the first half of the 4th millennium appears relatively sparse and ephemeral, consisting as it does of a few, mostly scattered pits and some post holes, all truncated, together with evidence for the cooking (by roasting and boiling) and probable consumption of food and the deposition of waste material. Insofar as any patterning can be made of the arc of post holes in the area of later Pit Group 2 (C3937, C3935, C3975, C3977 and C3979, Illus 5), and the scatter of post holes in Field 1 (C2165, C2167, C2171, C2173, C2175, C2177, C2179, C2181, Illus 6), we seem to be dealing with fairly insubstantial (but not flimsy) post-built structures, with posts between 0.2m and 0.4m in diameter. We simply do not know whether there had been more substantial traces of what appears to be settlement-related activity in the unexcavated parts of the site, or elsewhere in the vicinity – the features and artefacts were found towards the margins of the excavated areas. It would thus be unwise to try to characterise the nature of the occupation (ie to assess whether it constitutes permanent or transient use of this place), given the sparse and truncated nature of the available evidence. Nevertheless, it is worthy of note as the earliest phase of activity is among the earliest evidence for the presence of the 'Carinated Bowl (CB) Neolithic' in Scotland (Sheridan 2007a; cf Whittle et al 2011). As with many other CB Neolithic sites, the Meadowend Farm features are located on well-drained soils in an area that would have been suitable for cultivation and grazing, close to a ready source of water. Likewise, as with many other CB Neolithic sites, the use both of domesticated species (ie barley and domesticated ruminant) and of wild resources (hazelnuts) is attested (Bishop et al 2009), while the presence of the blades of Arran pitchstone in an Early to Middle Neolithic context accords with our impression of farming communities for whom inter-connectedness and exchange was an important element of their identity and social reproduction, as well as being a way to procure desired items (Sheridan 2007a; Ballin 2009; Sheridan 2010; ScARF 2012b; Sheridan & Cooney 2014; Ballin 2015). (The chronological incertitude of the exotic flint blade has been noted above, but if it had belonged to this period of activity, it offers further evidence for inter-community exchange.)

The presence of Early Neolithic, traditional CB pottery is consistent both with the overall Scottish distribution of this ceramic tradition (Sheridan 2007a: fig 1) and with the distribution of finds around the Forth, including those from the mortuary enclosure at Bannockburn, Stirling (Cowie 1993: illus 6) and from apparently domestic contexts at Bantaskine, Falkirk (ibid: illus 7) and at Newbridge, Ratho and Maybury, Midlothian (Smith 1995; Moloney & Lawson 2007; Sheridan 2007a: 484). Its dating is also in line with the early 4th millennium dates that have been obtained for this ceramic tradition in Scotland; as argued at length elsewhere (eg Sheridan 2007a; 2010; 2016) it seems to have been introduced to Britain and Ireland, probably from northern France, by immigrant farming communities. Its sparseness and scattered distribution at Meadowend Farm, with parts of

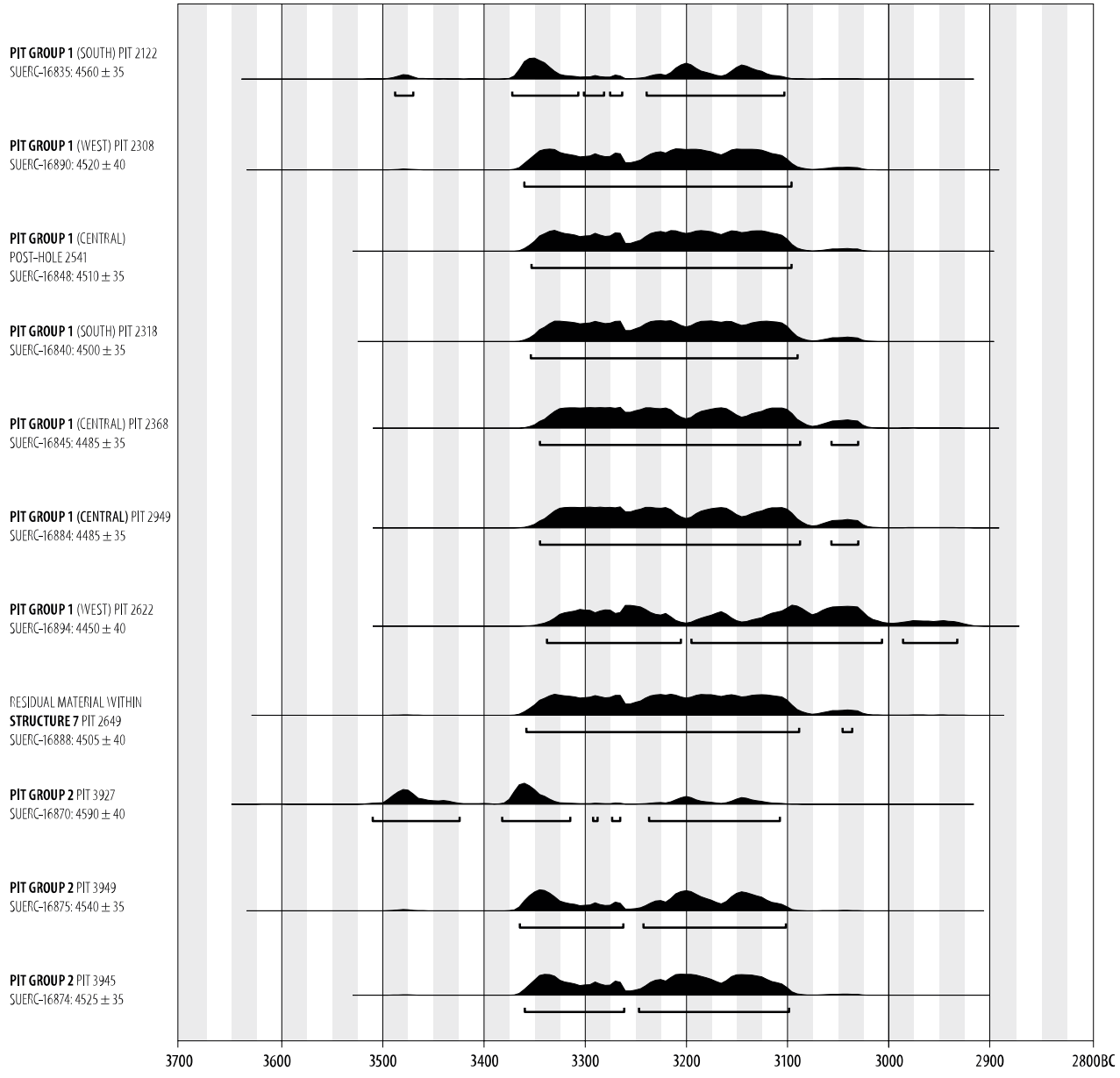
broken pots ending up in pits, is comparable to its occurrence at the aforementioned domestic sites, the only difference being that, at Ratho, the pottery was also associated with traces of what may have been a rectilinear timber house (Smith 1995).

The presence of the modified CB pottery is also consistent with the overall Scottish distribution of this type of pottery (Sheridan 2007a). Similar, but not identical modified CB pottery was found less than 4km away during development in Alloa (Mitchell et al 2010); that site produced comparably ephemeral traces of pits and postholes. Slightly further afield, other modified CB pottery has been found as scatters at Barbush Quarry, Dunblane, Stirling (Cowie 1993: illus 4) and in pits believed to be associated with circular structures at Chapelfield, Cowie, Stirling (Atkinson 2002).

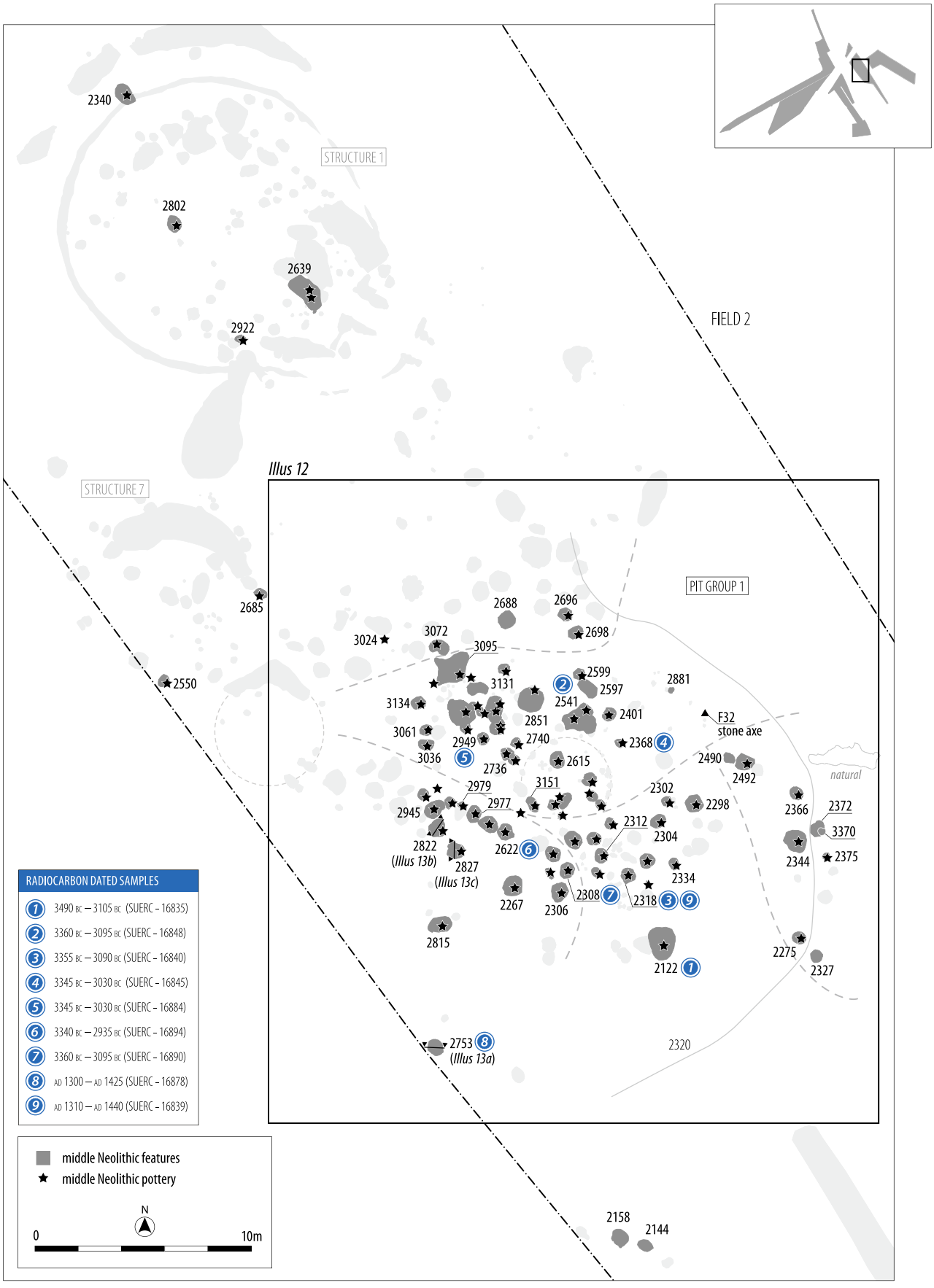
4. MIDDLE NEOLITHIC PIT GROUPS *c* 3350–3000 CAL BC

Elizabeth Jones & Julie Franklin

The principal indicator of features of Middle Neolithic date on the site was the presence of sherds of the very distinctive Impressed Ware pottery. These



Illus 10 Middle Neolithic radiocarbon dates. © Headland Archaeology



Illus 11 Middle Neolithic features, Field 2. © Headland Archaeology

were found in a large number of pits, which fell into three main spatial groupings (Pit Groups 1, 2 and 3), with Pit Group 1 comprising four clusters. Additional support for the Middle Neolithic date of these pits was provided by 11 radiocarbon dates, falling within the last third of the 4th millennium cal BC, which were obtained from Pit Groups 1 and 2 (Table 1 and Illus 10).

Pit Group 1 was located in Field 2 (Illus 11), with a scattering of other Middle Neolithic pits immediately to the north, while Pit Group 2 was located at the west end of Field 3 (Illus 14), with the smaller Pit Group 3 (Illus 15) to the east of this. Allocation of other features to this Middle Neolithic phase of activity – on the basis of physical proximity, or similarity of fills, to those pits that had produced radiocarbon dates and/or Impressed Ware – was complicated by the fact that the picture had been considerably confused by the presence of later features in the immediate vicinity. These lay over, though rarely cut, the Middle Neolithic pits. In particular the immediate proximity of Pit Group 1 and Bronze Age Structures 7 and 14 meant that it was impossible to tell whether some features represented outlying pits associated with the pit group, or Neolithic material that had been disturbed and redeposited during the Bronze Age. Post hole C3904, located towards the edge of Pit Group 2 (Illus 14), was particularly troublesome: it looked very similar to a neighbouring pit which contained Neolithic pottery, but its fill produced an Early Bronze Age radiocarbon date, and at least one of the pots in the pit (P233–P234) could be of Middle Bronze Age date. The grouping of the pits as presented below must therefore be regarded as a 'best fit' exercise, necessarily provisional in some cases; concerns and caveats about individual pits are noted in the text.

All three groups of pits contained flint and stone tools, hearth waste, charcoal and small amounts of charred cereal grain and hazelnut shell. Numerous other pits and post holes scattered over the rest of the site with no diagnostic finds may also date to this period, but the pottery-containing features indicate fairly discrete areas of activity. Possible structural evidence was identified among all the three pit groups.

4.1 Pit Group 1

This group of pits was largely confined to a localised sandy silt deposit (C2320) filling a shallow natural depression within the glacial sand and gravel deposits (Illus 11). Seven dates were all closely clustered, with a range of 3490–3105 cal BC (SUERC-16835) to 3340–2935 cal BC (SUERC-16894) (Table 1). One of these was a reasonably secure date from a barley grain in pit C2368, which seemed to relate to grain processing or cooking and was in the middle of this range at 3345–3030 cal BC (SUERC-16845). A small ground stone axehead (F32, Illus 25 & 26) was found on the surface of this deposit. Two long slot trenches were excavated through C2320 and it was found to be 0.2m deep at the centre, thinning out towards the edges. No features were found below it. Around 100 pits were found within this area, with a few scattered to the north and south of the main concentration. The pits varied greatly in size and shape but were generally relatively shallow (around 0.1m) and none was greater than 0.4m in depth, although clearly, as noted above, a considerable depth had already been lost through subsequent land use. Most of the pits contained a single fill, generally mid-brown sandy silt containing stones but little charcoal. Around 20 of the pits contained fills that were rich in charcoal, indicating the deposition of hearth waste. This occurred either as a single charcoal-rich fill, or a series of multiple fills including a charcoal-rich layer that was usually overlain by a layer of sand or redeposited natural. The nature of the pit deposits is shown in Illus 12, which also shows the features interpreted as hearths on the basis of in situ burning. Pottery was found throughout the features and was not associated with any particular type of deposit; likewise, some pits and hearths contained no finds. While the general impression is of an indistinguishable mass of pits, with no large clear spaces or obvious structures, the pits do fall into several clusters, as described below.

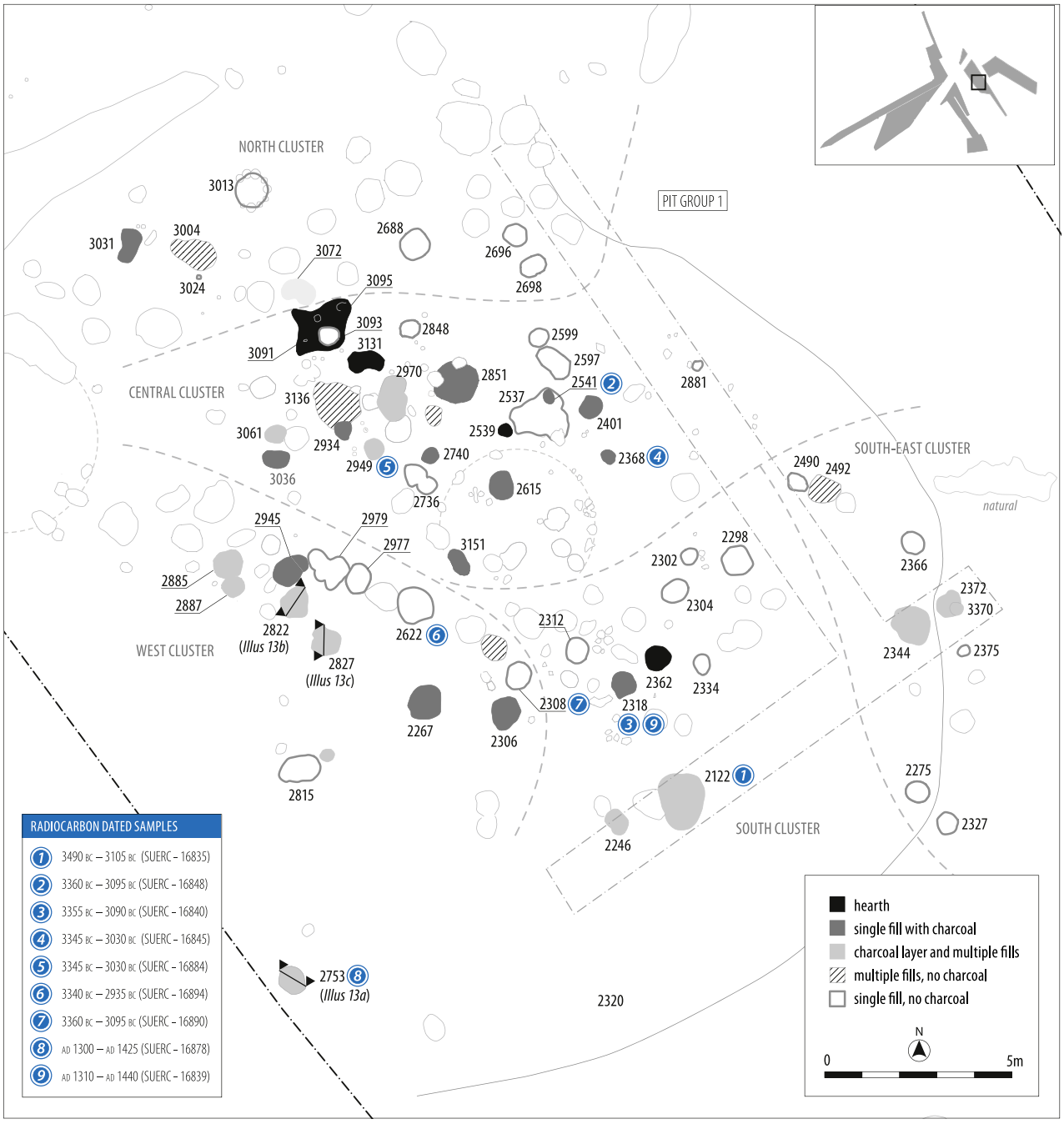
4.1.1 South-east cluster

A group of pits on the south-eastern edge marked the limits of the sandy silt deposit, with pits found on either side of the deposit boundary. These comprise an arc of 12 pits from C2327 to C2490. Pottery was found in five of the pits, with sherds

from a single large bipartite bowl with stab-and-drag decoration on the neck (P144, Illus 20) found in three of the pits (C2275, C2375, C2492). The pits were of varying shape and size, with most containing a single fill. Two of the larger pits at the centre of the arc (C2344, C2372) both contained a thin charcoal-rich primary fill overlain by brown silty sand. The upper fill of C2344 also contained fragments of burnt clay and pottery. Pit C2372 cut an earlier post hole (C3370). Pit C2492 at the north end of the arc also contained multiple fills. The primary fill contained large flat sandstone slabs at the base and consisted of dark brown silt and was heavily disturbed by roots. The upper fill was light brown silt containing angular stones and the fragments of vessel P144.

4.1.2 North cluster

At the northern end of Pit Group 1 the pits were arranged in neat rows and evenly spaced with

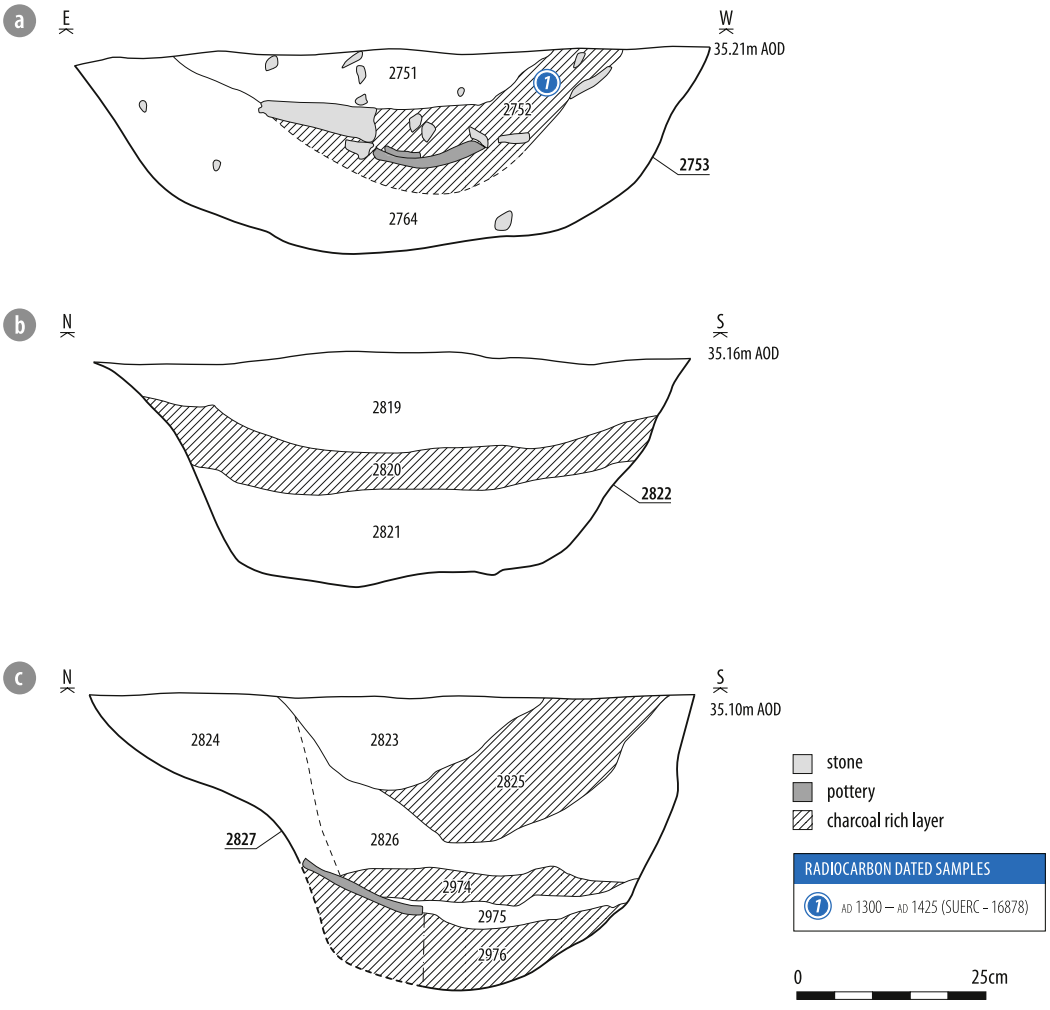


Illus 12 Middle Neolithic Pit Group 1. © Headland Archaeology

no intercutting, indicating they were visible on the surface, either because they were broadly contemporary or were marked in some way. Pottery was found in five of the features (Illus 11) and sherds from a single undecorated collared jar (P32, Illus 23) were found distributed in pit C2698, nearby pit C2599 (grouped here under the central cluster) and stake hole C3024. Pot P32 had suffered spalling around the collar, which suggested burning through repeated use as a cooking pot. The pits were of a similar size and tended to be sub-rounded in shape, with vertical sides and a rounded base; they measured 0.6–0.7m in diameter and 0.14–0.25m in depth. The larger pits towards the edge of the area tended to be slightly shallower and more oval in shape but were similar in depth. The fills in all the pits were generally of mid-brown sandy silt. Two pits contained different fills: pit C3031 appeared to consist of two adjoining post holes and contained fragments of charcoal in the fill; and pit C3004 had a primary fill comprising black silt with frequent angular stones overlain by a layer of fine sand. Pit C3013 was also of note as it contained a ring of stake holes around its eastern edge (Illus 12). It measured 1.2m by 0.85m and was unusually deep for the pits in the area at 0.36m. It contained a single fill of mid-brown silty sand with no charcoal and nothing to indicate its function. The bulk of the pits in this area were not sampled due to the uninformative nature of their fills, and those that were did not produce environmental remains.

4.1.3 West cluster

The pits on the western edge of the group were clustered in a line running roughly north-west to south-east (Illus 12). Later features had cut four



Illus 13 Pit Group 1 sections. © Headland Archaeology

of the pits but the rest were discrete features that did not intercut, again suggesting that they were contemporary. Pottery was recovered from several of the pits, including C2306 (P168, Illus 20), C2815 (P164, Illus 18), C2827 (P116, Illus 23), C2977 (P124, Illus 20) and C2979 (P106, Illus 18). The pits were generally sub-rounded, with diameters of 0.6–0.8m and were generally 0.3–0.35m in depth. There were several larger, irregular-shaped pits at the north end of the cluster and numerous small pits or post holes dispersed throughout. Most of the features had a single mid-brown silty sand fill with no charcoal. A number of the pits in the centre contained alternating fills of charcoal-rich deposits with what appeared to be natural silting. This is demonstrated clearly in the section through pit C2822 (Illus 13b). The primary fill (C2821) was light brown gravelly silt similar to natural subsoil. It was overlain by black charcoal-rich silt (C2820) containing fragments of burnt granite and sherds of Impressed Ware (P126, P127 not illus), followed by another layer of silt (C2819). Pits C2885 and C2887 did not contain the initial layer of silt, but did contain a layer rich in charcoal overlain by redeposited natural. Pit C2945 contained a single fill containing charcoal, which also contained pottery. Pit C2827 also contained a series of alternating charcoal-rich and sterile silt layers (Illus 13c). Conjoining sherds of pottery from an exceptionally large, baggy, flattish-based pot (P116, Illus 23) were found both in its primary fill (C2976) and the upper charcoal-rich fill (C2825). Stone slabs partly lined one of the sides. Other pots from this pit group also included very large examples including a massive coarse bowl (P106, Illus 18, pit C2979), and a huge collared bowl (P124, Illus 20, pit C2977).

Environmental samples from this cluster of pits produced only rare to occasional charred plant fragments, with no differentiation between those pits containing pottery and those without. Two pits, C2308 and C2622, were dated to 3360–3095 cal BC (SUERC-16890) and 3340–2935 cal BC (SUERC-16894, Table 1) using charred hazelnut shell and charred naked barley grain respectively. No pottery was found in these two pits.

4.1.4 Central cluster

The central cluster was a less coherent group, though it did contain a number of similar features (Illus 12). The pits varied from stake holes through to large irregular pits but many were sub-circular, up to 0.5m in diameter and generally less than 0.2m deep, and contained single fills without charcoal. Several of the features contained pottery (P44–P88, Illus 18–22). The features in this cluster showed some evidence that they may have been associated. There were several irregular-shaped pits such as C3091, measuring 1.9m by 1.3m, with fairly shallow sloping sides and 0.27m in depth. It was filled with pinkish-grey sand (C3092) – possibly stained that colour by ash – which contained burnt bone, charcoal flecks, daub and flint (F23, F24). Cut through the pit were a post hole (C3093) and three large stake holes, with several smaller stake holes around its southern edge. To the south of this feature was a burnt sandstone slab C3131, thought to have been the location of a hearth. Adjacent to the slab were two large pits, C3136 and C2970. These were sealed by a charcoal-rich spread (C3095, not illus) containing pottery, burnt bone and fired clay, which covered a number of features in the area. At least ten different pots were represented by the sherds from this spread, including one trunconic (ie shaped like a truncated cone) jar and at least four bowls (P41–P50, Illus 18 & 19). The presence of a hearth and stake holes, and of fired clay within and sealing some of the features, suggests that this may have been the location of a structure of some sort.

Three other nearby pits, C3061, C2949 and C2736, were of interest. Pits C3061 and C2949 each contained a charcoal layer that had been sealed by a layer of sandy silt, similar to those found in the western cluster. A flint flake (F21) was recovered from C3061 and a very small quantity of charred naked barley grain from C2949. A charred naked barley grain from C2949 returned a radiocarbon date of 3345–3030 cal BC (SUERC-16884). Pit C2736 by contrast contained a relatively large quantity (48 grains per litre) of charred naked barley grain, plus sherds of at least four different pottery vessels including two collared bowls (P87–P88, Illus 21).

To the south of these features was a group of pits that appeared to encircle pit C2615. That pit

was around 0.7m in diameter and was 0.32m deep. It contained a mottled orange and black silt with pottery, including fragments from two vessels, a very large thick-walled, deep simple bowl (P84, Illus 18) and a large trunconic jar which had been subject to burning after breakage (P83, Illus 22), as well as charcoal, charred hazelnut shell and naked barley grains. Pit C2615 and a few other pits were partly encircled by a rough arc of stake holes and small post holes on its north and eastern sides. These suggest the line of a lightly constructed circular structure surrounding a hearth about 4.3m in diameter. Although there was no evidence for in situ burning within this structure, a small pit, C2539, to the north-east contained fire-cracked stones and abundant charcoal as well as small amounts of hazelnut shell and naked barley grains within the fill. A flint flake (F12) was also recovered from this pit. Adjacent to this was a spread of compacted silty sand and stones within an irregular-shaped pit, C2537, measuring 1.70m by 1.35m and 0.25m in depth. Abundant naked barley grains were found in this pit as well as hazelnut shells and seeds of sedge. Post hole C2541 within this pit contained a charcoal layer from which charred naked barley grain was dated to 3355–3095 cal BC (SUERC-16848).

4.1.5 South cluster

The southern cluster of pits comprised mostly single-fill pits similar to those found in the other clusters (Illus 12). Pottery was recovered from most of the pits in this cluster (eg P138–P142, P153–P157, P174–P180, Illus 18, 20, 23 & 24). A single hearth pit, C2362, was found towards the centre of the cluster, measuring 0.70m by 0.65m and 0.20m deep. It was filled with black charcoal-rich silt with frequent fire-cracked stones and sherds from three Impressed Ware vessels including a small shallow collared bowl (P174, not illus). To the west of the pit were several groups of stake holes.

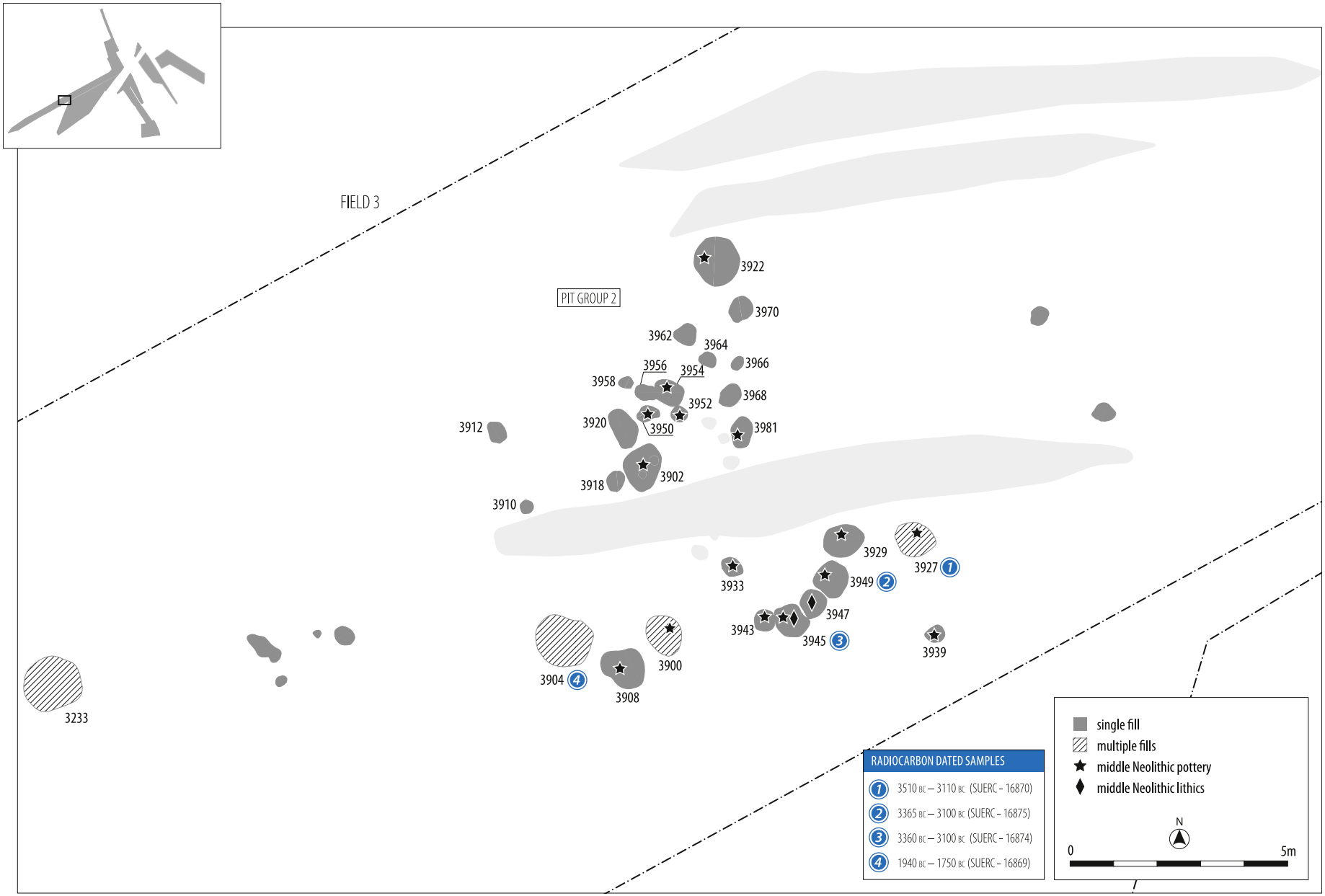
At the south side of the southern cluster was a sub-oval pit, C2122, the largest pit in Pit Group 1, measuring 1.43m by 1.17m and 0.40m in depth. It was largely filled with mid-brown sandy silt containing lenses of orange sand, although there was a thick band of charcoal-rich silt towards the base of the pit. The pit contained fragments of at least three vessels (P178–P180) including a largely complete, deep, baggy jar (P180, Illus 23 & 24). A small quantity of charred naked barley from the pit was dated to 3490–3105 cal BC (SUERC-16835). To the west, pit C2246 contained a charcoal layer sealed by a layer of silt. The only other pit of note in the area was C2298. The base of this pit was lined with the largely disintegrated wall of a large, coarse bowl with widely splaying walls (P140, not illus).

To the north of Pit Group 1 were several isolated pits containing Impressed Ware pottery (Illus 11). Of note were pit C2340, truncated by the later Structure 1, which contained part of a collared bowl within its fill (P21, Illus 21), and pit C2802, which was almost completely filled with a stone 'pillar' and also contained sherds from two bowls (P22–P23, not illus).

4.2 Pit Group 2

This group contained around 40 pits and post holes, concentrated in an area roughly 10m by 10m in Field 3 at the western end of the site (Illus 14). Three pits (C3924, C3944 and C3948) produced radiocarbon dates that are virtually identical at the 68.2% probability range, within the last third of the 4th millennium (SUERC-16870, SUERC-16875, SUERC-16874). Fifteen of the features contained Impressed Ware pottery fragments. The nature of the deposits within the features was broadly homogeneous, consisting of mid- to dark brown sandy silt and gravel fills, with no distinct charcoal-rich layers as seen in Pit Group 1. The features fell into two clusters, though this probably reflects the intrusion of a plough furrow running through the middle of the group rather than any real separation.

The pits defining the southern edge of the group were on the whole large and sub-circular in plan. An arc was formed by pits C3943, C3945, C3947, C3949 and C3929. Pits C3943–C3949 were 0.5–0.7m in diameter, generally increasing in size from west to east, and were 0.15–0.19m deep. They were all filled with a homogeneous mid-brown sandy silt with stones and occasional charcoal flecks. All four pits were intercut, with the similar fills making any relationships impossible to discern. At the east end, pit C3929 was slightly larger, at 0.94m by 0.74m and 0.14m deep. It was filled with reddish-brown sandy silt but was otherwise similar to the others in its inclusions. Pits C3929, C3945



Illus 14 Middle Neolithic Pit Group 2. © Headland Archaeology

and C3949 each contained fragments of several Impressed Ware vessels (P204–P206, P214–P216, Illus 17, and P199–P201, respectively). Sherds from C3943 (P306–P308) are potentially of Bronze Age date, as discussed below. A small quantity of charred hazelnut shell found in pits C3945 and C3949 was radiocarbon-dated and returned similar dates of 3360–3100 cal BC (SUERC-16874) and 3365–3100 cal BC (SUERC-16875). Both of these pits also contained very small amounts of naked barley grain and flint (F25, F26).

Two other large pits on the outside edge, C3900 and C3927, contained multiple fills interpreted as post-pipes. Pit C3900 was 0.55m in diameter and 0.26m deep. It was filled with a post-pipe comprising dark brown silt and reddish-brown silty sand with packing stones and backfill material. Four sherds of Impressed Ware from a heavy collared bowl (P213, not illus) were found within the packing stones. C3927 was located 5m to the east of this. It measured 0.90m in diameter and was 0.21m in depth. The post-pipe consisted of dark brown sandy silt with occasional charcoal flecks, with packing material. Sherds from seven Impressed Ware vessels came from the post-pipe (P192–P195, Illus 20), and sherds of another five vessels from the packing material (P196–P198, P202–P203, not illus). Hazel charcoal from this packing material returned a similar date to that of the other pits in the group: 3510–3110 cal BC (SUERC-16870). The post holes do not appear to form a coherent roofed structure but presumably stood as posts with some other function or significance. Pit C3908 lay immediately to the west of C3900. It was slightly irregular in shape and measured 1m in diameter and was 0.15m deep. It contained a single fill of mid-brown silty sand, which contained sherds from two vessels, a bowl with externally bevelled rim (P211, Illus 19) and a fairly large bipartite bowl (P212, not illus). Post hole C3904, immediately to the west of C3908, appeared to be very similar to C3900, containing an apparent post-pipe of organic-rich material suggesting that a post had rotted in situ. However, hazelnut shell from the post-pipe returned an Early Bronze Age date of 1940–1750 cal BC (SUERC-16869); and since it also contained two pots that were not of Impressed Ware and are probably of Bronze Age date (P233–P234, not illus), it seems likely that this feature was not part of this area of Neolithic activity.

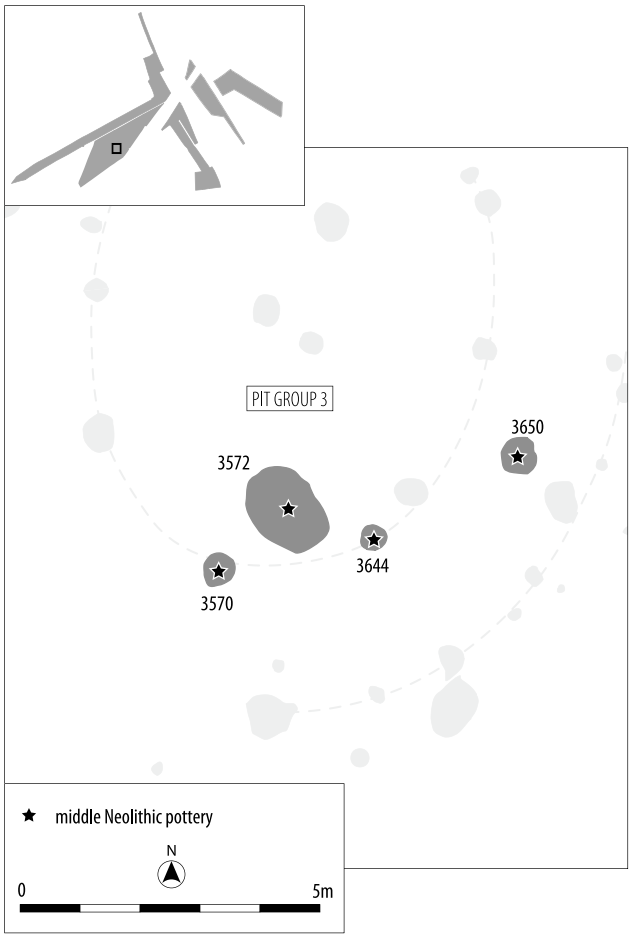
The northern pits were generally of slightly smaller size, generally 0.5–0.6m in diameter and between 0.07m and 0.15m in depth. The exceptions were three larger pits at the edges of the group. To the west pit C3902 measured 1.2m by 1.0m and was 0.25m deep. It was filled by mid-brown sandy silt and contained a very small quantity of indeterminate cereal grain together with a broken roughout for a stone axe- or adze-head (F31), some flint debitage (F23, F24) and a number of sherds from at least four Impressed Ware vessels including a small cup or bowl (P188, Illus 16), another small bowl and a large, thick coarse pot (P189–P191, not illus).

The large adjacent pit C3920 contained no finds. It measured 0.92m by 0.60m, was 0.14m deep and was filled with dark brown sandy silt with frequent stones and some charcoal. The different fill suggests a different use for the pit, although the quantity of charcoal is too low to suggest this may be hearth waste. A large pit on the northern edge of the pit group, C3922, measured 1.16m by 1.10m and was 0.36m deep, much deeper than the rest of the pits in this group. It was filled with similar material to C3920, although it contained no charcoal.

Of the sampled features in this pit group, only a few cereal grains were recovered from six of the features; these were of wheat and barley. Small quantities of hazelnut shells were recovered from eight features.

4.3 Pit Group 3

To the east of Pit Group 2 were four other features that contained Impressed Ware (Illus 15). These were in the same area as a group of post holes thought to form a Middle Bronze Age structure, Structure 6 (described below). The largest feature was a pit, C3572, which measured 1.15m in diameter and was 0.5m deep. Sherds from at least four pots were recovered from this pit (P223–P226, Illus 20) with a further, conjoining sherd from P223 found in nearby post hole C3644. The pit was filled with mid-brown sandy silt and contained frequent charcoal, and a few barley grains, though it had been heavily disturbed by burrowing. A second pit, C3650, to the east, measuring 0.8m in diameter and 0.24m in depth, contained three sherds from a saggy-based pot (P227, not illus). The fill was



Illus 15 Middle Neolithic Pit Group 3.
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similar to that of C3572, with few inclusions. Two of the post holes on the line of Structure 6 also contained single sherds of Impressed Ware pottery, namely C3570 and the aforementioned C3644 with its sherd from P223. It may be that these sherds are residual, redeposited either during post-depositional burrowing in pit C3572 or else during the construction of Structure 6.

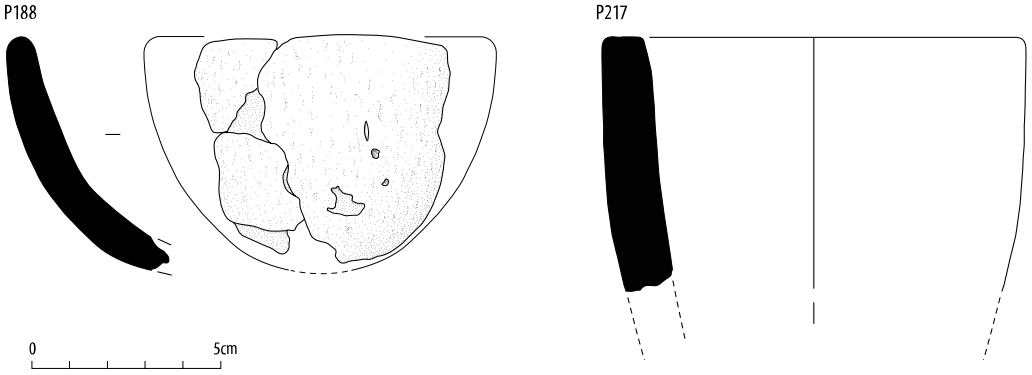
4.4 The Middle Neolithic Impressed Ware assemblage

Alison Sheridan

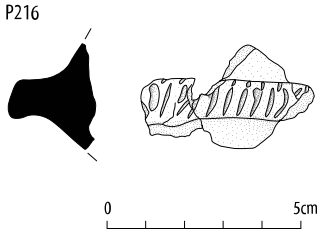
The Middle Neolithic Impressed Ware pottery constitutes around two-thirds of the entire Meadowend Farm ceramic assemblage, with at least 206 individual vessels being identifiable (P21–P227, Illus 16–23), along with one piece of what looks to be burnt daub (from pit C3091) and several pieces of burnt clay, either daub or potter's clay (from pit C2122 – both pits located in Pit Group 1). There may have been several more vessels, since it was not possible, in every case, to be sure whether more than one similar-looking pot was present in a given context. Most of the Impressed Ware pottery was found in and near the three pit groups (Illus 11, 14 & 15). Most contexts contain just small parts of one or two pots, but parts of up to nine vessels (P41–P50, Illus 18 & 19) were found in charcoal-rich spread C3095 within the central area of Pit Group 1, and in a few features large parts of individual pots were found, crushed flat, and usually on their side (eg Illus 24). A high proportion had been burnt, perhaps through repeated use as cooking pots and/or as broken sherds lying around in hearths before being placed in the pits. This latter is clear from P83 (Illus 22) from pit C2615 (Pit Group 1 central), where conjoining sherds show different degrees of burning.

The dating of this pottery to *c* 3350–3000 cal BC has been established by radiocarbon dates from 11 pottery-bearing contexts from Pit Groups 1 and 2 (Illus 10). That the pottery from the undated contexts is also likely to fall within this date bracket is indicated not only by the similarity and spatial proximity of most of these contexts to the dated contexts, but also by the overall homogeneity of the assemblage, with the same few vessel forms, decorative techniques and decorative schemes recurring. Contemporaneity is also demonstrated by the occasional presence of sherds from the same vessel in different contexts: for example, parts of P144 (Illus 20) were found in pits C2275, C2375 and C2492 (Pit Group 1 south-east), up to *c* 8m apart; sherds from P223 (not illus) were found in adjacent pits C3644 and C3572 (Pit Group 3); and conjoining rim sherds from P36 (not illus) were found in two pits, C2848 and C2945 (Pit Group 1 west and central), separated by *c* 7m. The presence of possible cereal impressions on two pots, P36 (not illus, C2945, Pit Group 1 west) and P191 (not illus, C3902, Pit Group 2), suggests that pottery manufacture took place within a domestic context.

All but one of the pots whose shape is clear can be classified as either bowls (ie wide vessels, with a width-to-depth ratio around, or in excess of, 2:1, Illus 18–21) or jars (ie large, deep vessels where the depth equals or, more usually, exceeds the width: Illus 22 & 23). The only exceptions are three small pots, all with a rim diameter less than 120mm: P188 (Illus 16, pit C3902, Pit Group 2) seems to be a



Illus 16 Middle Neolithic pottery: cups. © Headland Archaeology

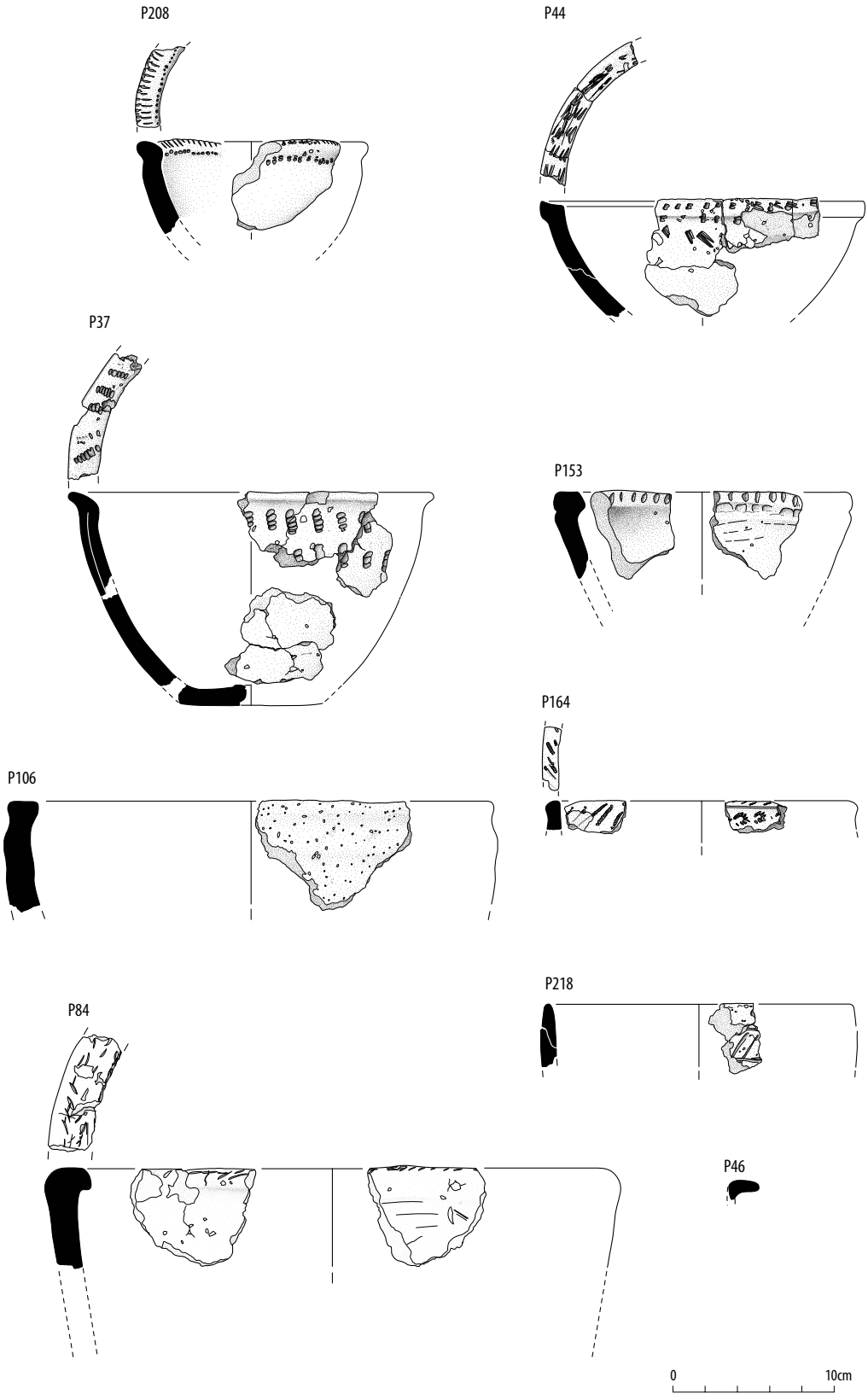


Illus 17 Middle Neolithic pottery: decorated lug. © Headland Archaeology

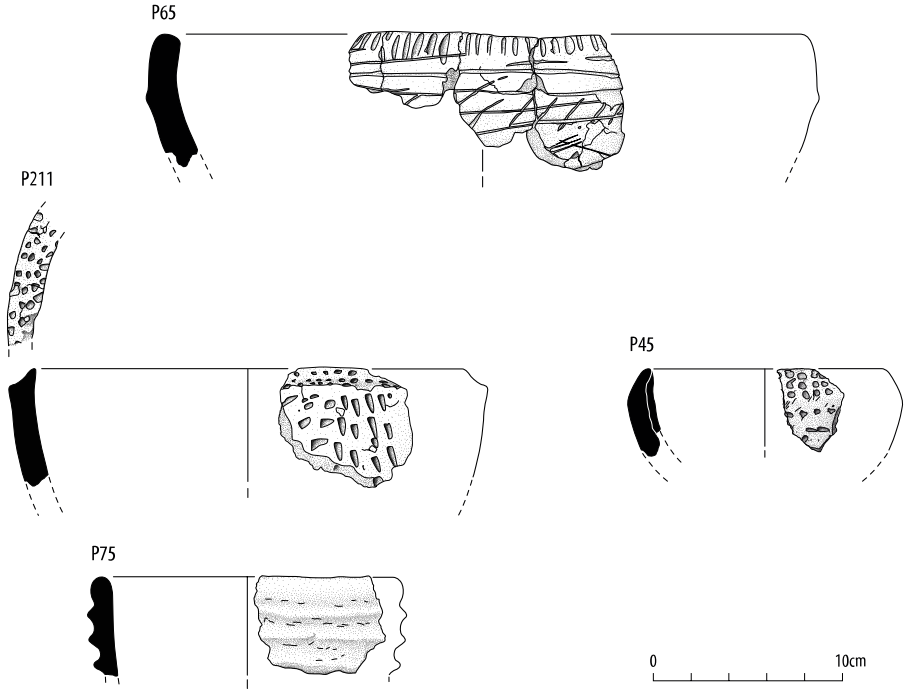
round-based cup; P217 (Illus 16, pit C3525, isolated feature to the south of Pit Group 2) is probably flat-based; and the base shape of P196 (not illus, pit C3927, Pit Group 2) is indeterminate. Some overlap in function exists, with both bowls and jars being used as cooking pots (to judge from the burnt-on organic residues present on the interior of many pots, and from the results of lipid analysis, as discussed below). There is also no spatial or contextual differentiation between the vessel types. Indeed, the distinction between bowls and jars should not be overstated, since the trunconic variants of each show a continuum of sizes and designs, as do some of the collared vessels. Both bowls and jars have a horizontal hollow zone, or 'cavetto', beneath the rim or collar (eg P87, Illus 21, pit C2736, Pit Group 1 central; P32, Illus 23, stake hole C3024, pits C2698, C2599, Pit Group 1 north). This could have served, like the carination or collar on bipartite bowls, to assist the tying of an organic cover to the bowl and/or to prevent the vessel from slipping through the hands, in addition to having any aesthetic design role.

Bowls predominate, forming over 80% of the assemblage. They occur in small, medium and large sizes (with rim diameters ranging from 125–199mm, 200–274mm and 275–390mm respectively, the medium category predominating). Both simple and bipartite forms are present, with the latter including collared bowls. A single example (P216, Illus 17, pit C3945, Pit Group 2) has a lug, which is ledge-shaped and decorated. Many have a trunconic profile, with a narrow flat or saggy base. A few may well have had a round base. Both angular and curvilinear rim forms are present, with the former predominating. A few simple bowls, in particular an especially large example (P84, Illus 18, pit C2515, Pit Group 1 central), have heavy rims that project towards the interior of the pot.

Most bowls are decorated, with the decoration usually restricted to the upper part of the body (including the top of the rim); in a few cases, it extends further down the body and in one case it occurs on the interior, below the rim (P164, Illus 18, pit C2815, Pit Group 1 west). With but a few exceptions, the decoration is by impression, with thumbnail impression being the commonest technique. In most cases, the nail has been jabbed in at right angles to the pot, but sometimes a more oblique angle has been used, leaving a broader impression, and in several cases (eg P168, Illus 20, pit C2306, Pit Group 1 west; P147, Illus 21, pit C2366, Pit Group 1 south-east) the nail has



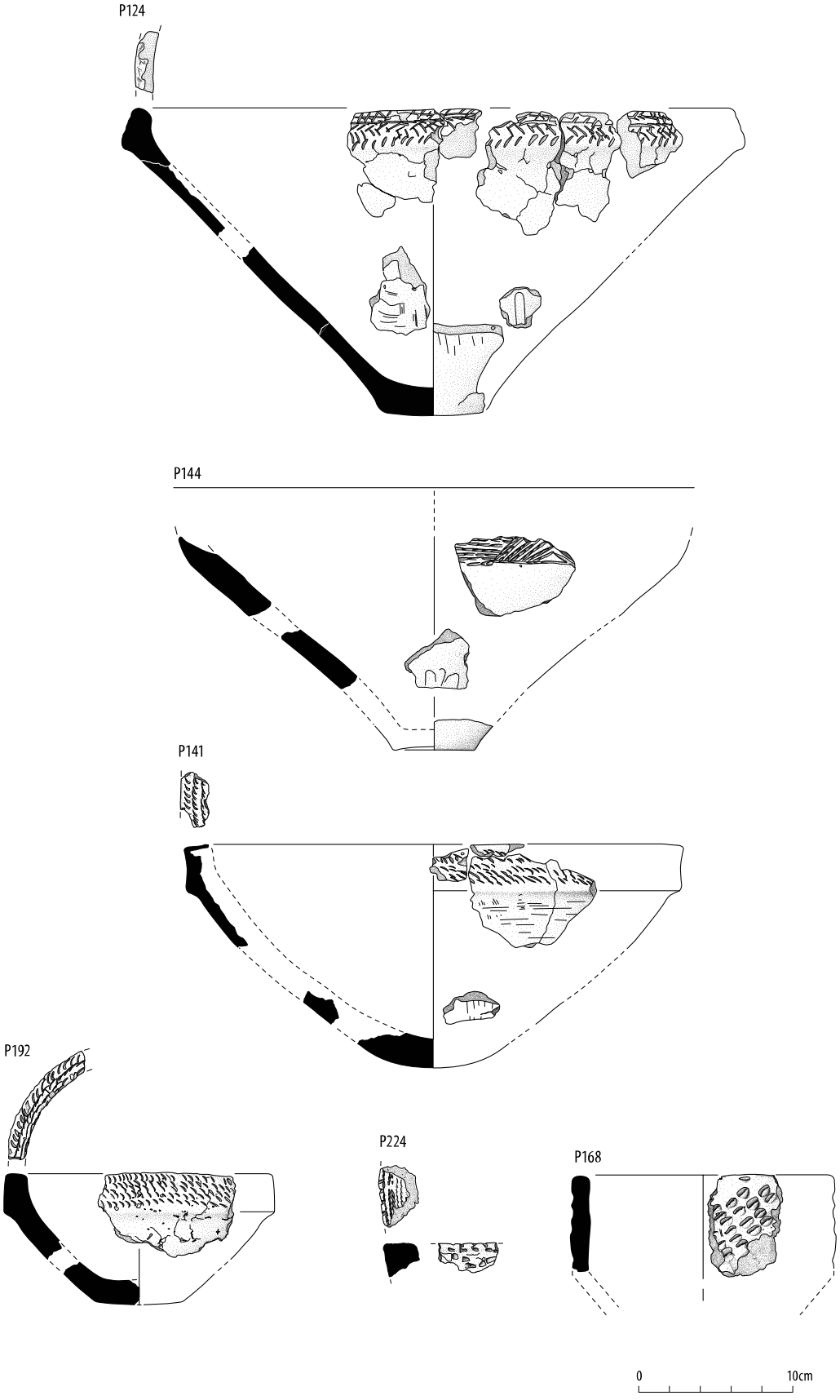
Illus 18 Middle Neolithic pottery: simple bowls. © Headland Archaeology



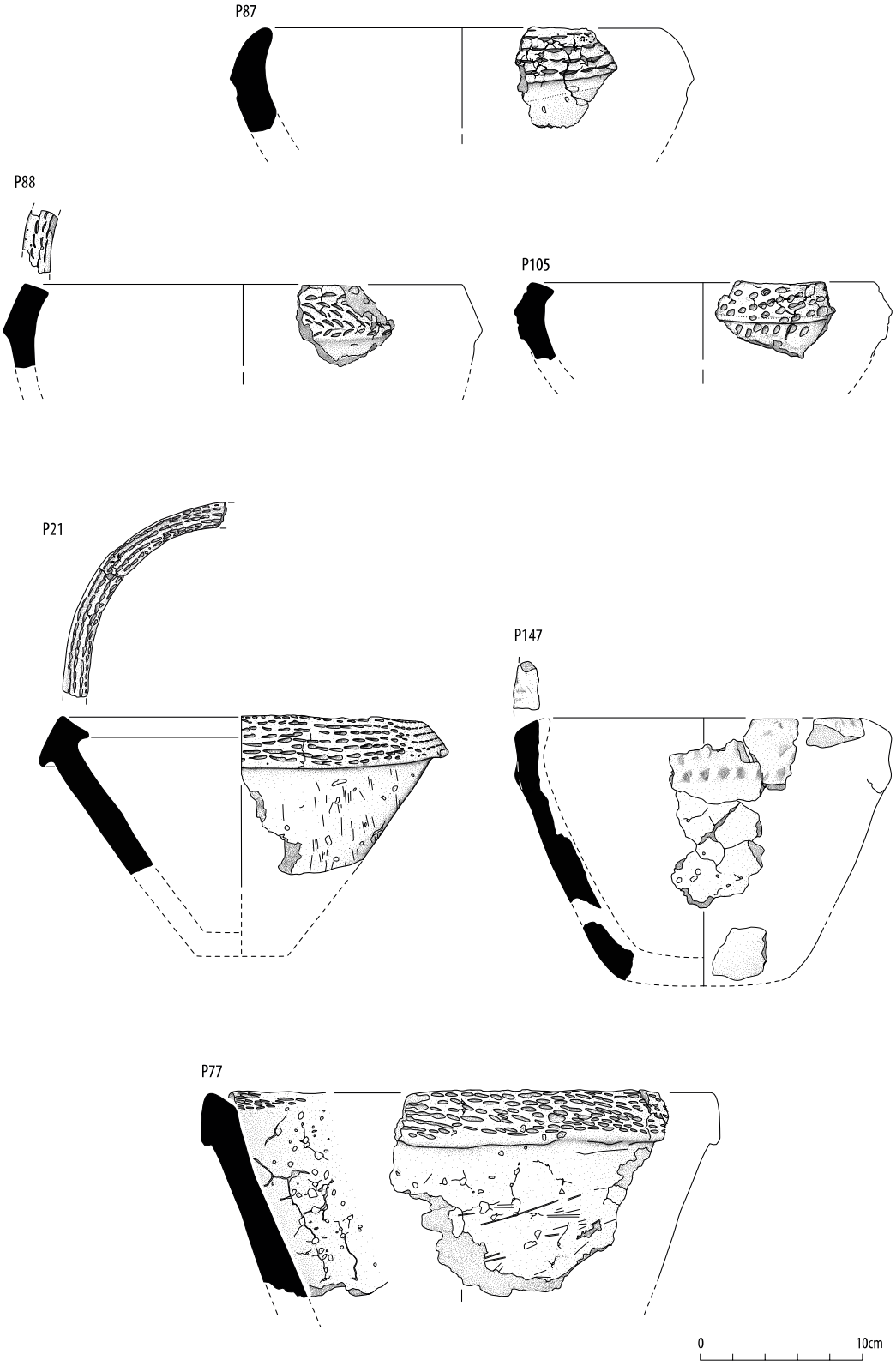
Illus 19 Middle Neolithic pottery: simple bipartite bowls (P65 approaches a collared bipartite bowl in form) and corrugated bowl (P75). © Headland Archaeology

been pulled through the clay, to create a gouged, 'rusticated' appearance. Both right-handed and left-handed impressions are attested. Other impressions have been made using sticks or similar implements, with variously-shaped ends (eg P211, Illus 19, pit C3908, Pit Group 2) and possibly bird bones (eg P208, Illus 18, pit C3933, Pit Group 2). Whipped cord was also used to make linear 'maggots' (P37, Illus 18, pit C2848, Pit Group 1 central), found especially on simple trunconic bowls. In one case whipped cord was used to make loops (P164, Illus 18, C2815, Pit Group 1 west). Linear twisted cord impressions are very rare in this assemblage, being noted on only two pots (P176, not illus, hearth C2362, Pit Group 1 south; P224, Illus 20, pit C3572, Pit Group 3). There are a few examples of stab-and-drag decoration, made using a pointed tool (eg P21, Illus 21, pit C2340, north of Pit Group 1 within Structure 1) and of incised decoration (eg P65, Illus 19, pit C3136, Pit Group 1 central). One unique vessel features horizontal moulded ridges below the rim (P75, Illus 19, post hole C2541, Pit Group 1 central). The commonest decorative scheme consists of a rim-top design featuring concentric or diagonal lines or a herringbone pattern, accompanied by a band of horizontal, diagonal or herringbone impressions (or a combination of these) on the collar or neck.

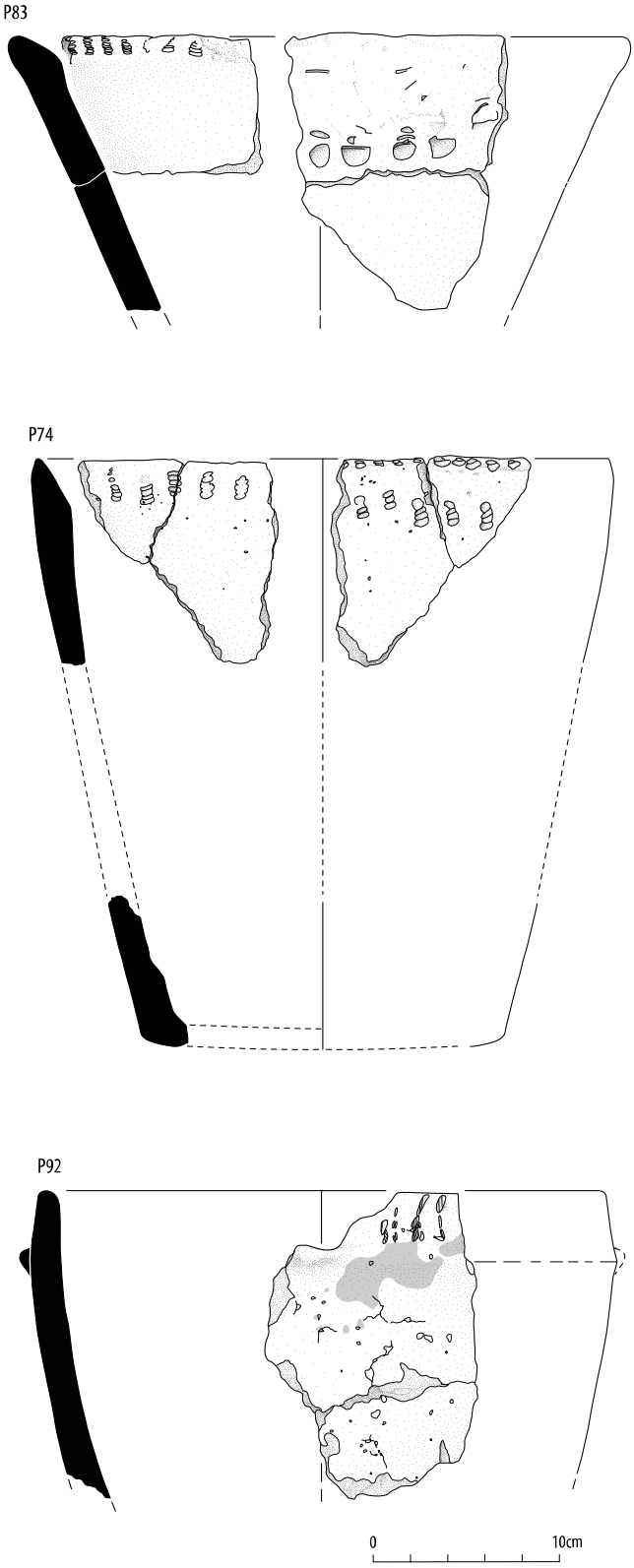
Bowls vary in their fineness of fabric and surface finish, although none comes near the finest of the Early Neolithic traditional CB pots. Lithic inclusions may be sparse, rarely exceeding a density of over 7%, but are sometimes fairly large (above 4mm in their maximum dimension); as noted above, locally available crushed quartz dolerite features as the filler of choice. Smoothing of the surfaces has been achieved through wet-wiping (sometimes using bunches of grass) and, probably in some cases, through the application of a thin clay slip, but often the surfaces remain slightly uneven, and in the larger bipartite bowls, undulations caused by the finger-shaping of the body are visible (eg P84, Illus 18, pit C2615, Pit Group 1 central). Many of the sherds are laminar, a feature exacerbated by the burning of many pots, and fracture surfaces tend to be hackly rather than smooth. Wall thickness varies within and between bowls and, although some large vessels have thick walls, around 20mm (eg P84, Illus 18, pit C2615, Pit Group 1 central), others appear to have disproportionately thin walls, a factor that may well have contributed to their breakage in prehistory.



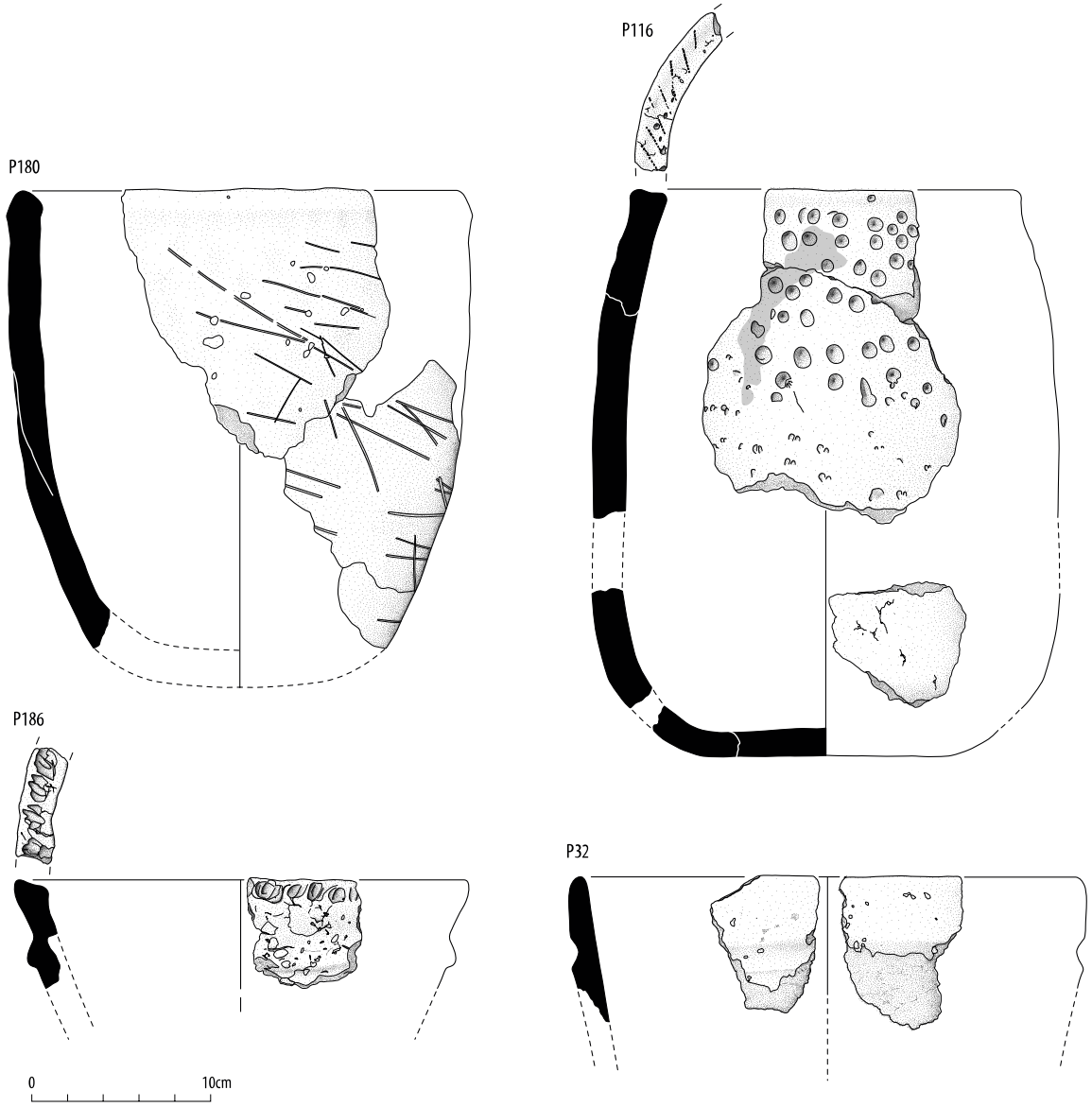
Illus 20 Middle Neolithic pottery: collared bowls. © Headland Archaeology



Illus 21 Middle Neolithic pottery: collared bowls. © Headland Archaeology



Illus 22 Middle Neolithic pottery: trunconic jar (P83) and wider-based jars (P74, P92). © Headland Archaeology



Illus 23 Middle Neolithic pottery: wider-based jars (P116, P180) and collared jars (P32, P186).

P124 (Illus 20, pit C2977, Pit Group 1 west), for example, has a maximum diameter of *c* 380mm and an estimated height of *c* 200mm, yet its lower belly wall is just 10mm thick. That the vessels had been constructed by adding flattened rings to a base is clear from instances where pots have broken along ring joint planes. A particular area of weakness is the carination or collar, as can be seen from P144 (Illus 20, pits C2492, C2275, C2375, Pit Group 1 south-east), where the vessel has broken around the point of inflection.

Jars constitute a smaller proportion of the assemblage, possibly around 10–15%. They seem to occur in three variants (Illus 22 & 23): a slender, deep, trunconic form, with a narrow flat or saggy base and often a rim with a steep narrow internal bevel; a broader, squatter form, with a wide flat or saggy base; and a collared form, which may have had a rounded, saggy or narrow flat base. Though no example of the latter form has a fully reconstructible profile, these collared jars seem to be a deeper variant of some collared bowls. Where the base-wall junction

Illus 24 Middle Neolithic pottery: P180 in situ in pit C2122. © Headland Archaeology

survives, it is gently rounded. The trunconic vessels tend to have proportionately fairly thin walls, around 10mm (eg P74, Illus 22, post hole C2541, Pit Group 1 central), while some of the broader-based and collared jars have considerably thicker walls, around 17–20mm (eg P180, Illus 23, pit C2122, Pit Group 1 south; P32, Illus 23, stake hole C3024 and pits C2698, C2599, Pit Group 1 north). Rim diameters for the trunconic jars range from 180mm to 310mm, with several falling at 250mm. The two most easily reconstructible broad jars have rim diameters around 220mm, and the largest of the collared jars (P131, not illus, pit C2622, Pit Group 1 west) has a maximum diameter of *c* 300mm.

All three jar types are decorated. Most of the trunconic jars have upright or diagonal whipped cord 'maggots' on their internal rim bevels, and sometimes additional 'maggots' on the exterior below the rim (eg P74, Illus 22, post hole C2541, Pit Group 1 central). Finger-pinched rustication, where the clay has been squeezed between finger and thumb, is present, either as an isolated feature or as a row, on the outside of trunconic jars, a little way below the rim. Nail-gouged rustication is also present. The broader jars have a variety of decoration: thumbnail impressions, incision, impression with a round-ended implement and (probably) a bird bone and uniquely, in the case of P116 (Illus 23, pit C2827, Pit Group 1 west), with a thin rectangular-toothed comb. This latter pot has a combination of a number of decorative techniques. The designs are loose and extend over most of the exterior (with P116 having decoration on its rim-top as well). Decoration on the collared jars is sparser and limited to the upper part of the body; P186 (Illus 23, pit C3952, Pit Group 2), for example, has one line of thumbnail-gouged rustication on its rim bevel and another on the outside of the rim. On all these jars, the external decoration may have served the additional function of roughening the surface, to prevent the pots from slipping through the hands while being carried.

The fineness/coarseness and surface finish of these jars varies, but all would count as relatively coarse pots, with the broad jars having particularly large lithic inclusions and uneven surfaces. Some have

clearly been used as cooking pots, and most have been burnt. In one case (P83, Illus 22, pit C2615, Pit Group 1 central), a heavily burnt rim and upper body sherd conjoins with a less heavily burnt body sherd. Some of the burnt, thick-walled vessels are particularly laminar and flaky or crumbly. The trunconic cooking jars must have been supported in some way when in use, perhaps by being nestled deeply in the hearth.

As noted above, one consistent feature of the Impressed Ware – and the other pottery from Meadowend Farm – is the use of crushed, locally available quartz dolerite as a filler. This suggests that the pottery was made locally, and when taken together with the evidence for possible cereal grain impressions on pots P36 and P191, it seems likely that it was made in the settlement itself.

4.5 Lipid analysis of Impressed Ware sherds

Lucy Cramp & Alison Sheridan

As part of the aforementioned broader study into the foodstuffs that were cooked and/or served in Neolithic pottery, 21 samples of Impressed Ware pottery were analysed for absorbed lipids at Bristol University (Cramp et al 2014). Of these, 14 produced a positive result, and in every case this was the same as that for the Carinated Bowl pot: the presence of ruminant dairy fat, suggesting the use of processed milk (possibly in the form of butter or yoghurt) in cooking. The pots in question are P21, P37, P39, P67, P98, P116, P124, P126, P144, P147, P183, P187, P188 and P192; the forms encompass both bowls and jars.

4.6 Middle Neolithic stone artefacts

Alison Sheridan

The most notable stone finds were a ground stone axehead and a fragment of a roughout for an axe- or adze-head. Chipped stone finds were few and undistinctive, including only a handful of flakes, blades and chips of flint, chert and quartz; these are catalogued in an archive report by Torben Ballin (Ballin 2007). As noted above, one cannot rule out the possibility that the blade of exotic flint, possibly from Yorkshire or further afield in England, that has been described above actually dates to this period of occupation.

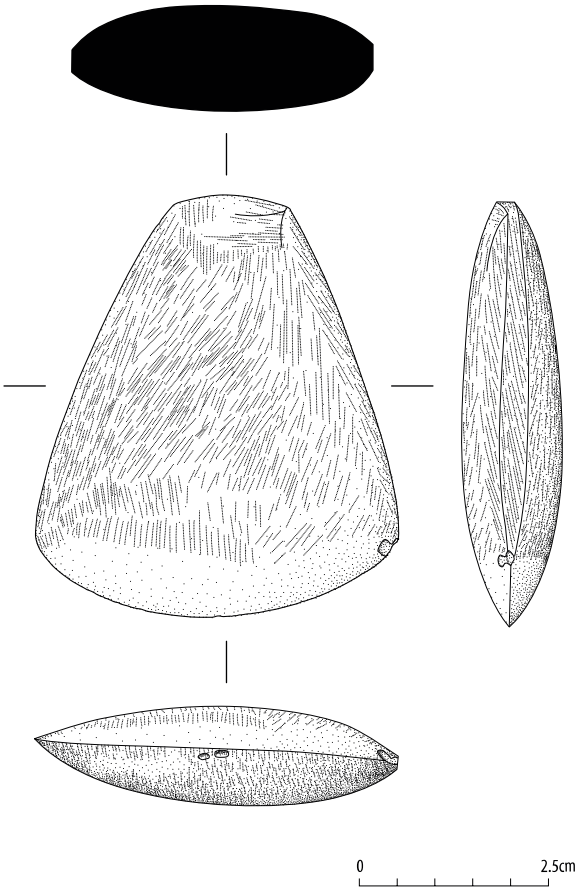
The axehead (F32, Illus 25 & 26) was found lying on the surface of spread C2320 within Pit Group 1. It is 58mm long by 48mm wide with a maximum thickness of 13mm. It is slightly asymmetrical in plan, with narrow facets along the sides and at the butt. It is in pristine condition, save for a tiny shallow ancient spall scar at one end of the blade on one side. Striations from the grinding of the axehead against a fine abrasive are visible on both sides and along the facets, as is a short low ridge near the butt on one side, reflecting the angle of the grinding. This small axehead had never been used as a chopping tool, even though it would have been large enough for fine woodworking, if used in a sleeve set within a haft. It may instead have been kept as a special possession.

It is made of banded fine-grained metamorphic stone, pale green and cream-coloured on one side and pale green with concentric dark-green banding on the other. There are small voids where mineral inclusions had leached out. The stone is a calc-silicate hornfels from the Neolithic quarry at Creag na Caillich near Killin, Perth and Kinross (Ritchie & Scott 1988; Edmonds et al 1992). Its identification by the author was confirmed by macro- and microscopic examination by Drs Brian Jackson and Simon Howard of the National Museums Scotland (NMS) Natural Sciences Department. Creag na Caillich is around 70km to the north-west of Meadowend Farm. The axehead can be dated by association with the pottery and radiocarbon dates from Pit Group 1 to the last third

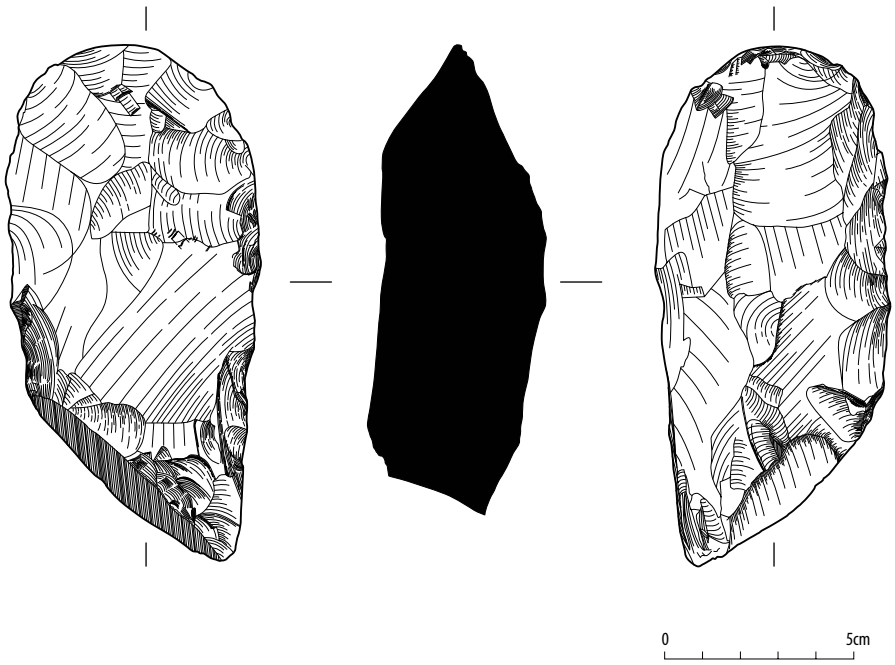
Illus 25 Neolithic polished stone axe (F32).
© Headland Archaeology

of the 4th millennium cal BC. As such, it constitutes a useful addition to the dating evidence relating to the exploitation of this rock source, and is consistent with existing evidence (Edmonds et al 1992). The distribution of axeheads made of this material (which bears the Implement Petrology Group name of Group XXIV) is extensive yet fairly thin (Edmonds et al 1992: illus 3). Only thirty confirmed examples are known (including one adze-head), with most being found in Perth and Kinross and between the Tay and the Moray Firths, although a few far-flung examples are known from England. Several more probable Group XXIV axeheads are known, but their petrological identification has not been confirmed by thin-sectioning. The nearest finds to Meadowend Farm are from Blair Drummond Moss and the Coldoch Estate, Stirling (RCAHMS 1988: 239). Axehead finds of any description are rare on settlement sites, although broken axeheads, or axehead flakes, are sometimes found (eg at Carzield, Dumfries & Galloway, an imported Group VI tuff axehead from Great Langdale, Cumbria: Sheridan 1993).

The broken roughout, found in pit C3902 in Pit Group 2, could have been intended as an axehead or adze-head (F31, Illus 27). It is 136mm long with a maximum width of 71mm and a maximum thickness of 44mm. The sides are straight and taper minimally towards the butt end. The blade end curves fairly deeply and in cross-section it is asymmetrical, with the 'top' side being considerably flatter than the 'underside' (hence the possibility that this could have been a roughout for an adze blade). It is unclear how much longer the roughout would originally have been, but if the surviving portion represents around two-thirds of its length, the original could have been fairly long at *c* 210mm. The blade has been slightly smoothed through wear (but not from use, or from the manufacturing process). The break is diagonal and had probably occurred along a natural plane of weakness in the rock, perhaps where there had been a change in its mineralogy; the presence beside it of a small area of dark, shiny blue-grey mineral lends weight to this suggestion. Even though the fracture surface gives



Illus 26 Neolithic polished stone axe (F32). © Headland Archaeology



Illus 27 Neolithic stone axe or adze roughout (F31). © Headland Archaeology

the appearance of being less weathered than the rest of the surface – it is a bluish-grey, whereas the rest of the exterior has weathered to a pale greenish-grey, tinged orange from the surrounding sediment and speckled with manganese accretions – it is clear from the flaking pattern that the break is ancient. A few of the flake scars around the fracture surface had been produced during the breakage, and these are as weathered as the other, manufacture-related, flake scars. The roughout had probably broken as the flaking process was coming to an end. No attempt to compensate for the breakage and to continue manufacture had been made; instead, the broken roughout was discarded in a pit, along with sherds of Impressed Ware and a chip and a flake of flint (F23, F24).

The stone has been examined macro- and microscopically by Drs Jackson and Howard, who have confirmed that the rock type is not from one of the sources that were repeatedly used for axehead manufacture during the Neolithic (as discussed, for example, in Clough & Cummins 1988). The stone, a fine-grained metamorphic rock rich in altered pyrite, is suspected to be a trachyandesite or felsite, although thin-sectioning would be necessary to arrive at a definitive petrological identification. If it is of trachyandesite, a potential source area lies within the Ochil Hills, around 20 kilometres to the north-east of the site.

The artefactual associations of the roughout suggest that it dates to between *c* 3350 and 3000 cal BC, although the close proximity of this pit to the post hole (C3975) that produced Early Neolithic traditional CB pottery and a radiocarbon date of 3905–3655 cal BC (SUERC-16876) should be noted. It is very rare to find roughouts on settlement sites in Neolithic Britain and Ireland (except in the vicinity of extraction sites), although stray finds demonstrate that some roughouts could be exported (or collected) some considerable distance from extraction sites. (See Sheridan 1986 for a discussion of the movement of porcellanite roughouts from County Antrim.) This specimen had probably been brought in in an already partly roughed-out state, to be finished on site.

4.7 Charred plant remains from the Middle Neolithic features

Scott Timpany, Sarah-Jane Haston & Laura Bailey

4.7.1 Pit Group 1

Pit Group 1 contained the largest concentration of charred plant remains (excluding charcoal).

The assemblage was dominated by naked barley grain with smaller numbers of barley-type grains, probably representing poorly preserved naked barley, together with small numbers of emmer wheat. As noted before, the oat grains from pit C2318 were found, upon radiocarbon dating, to be intrusive from medieval cultivation.

Four of the pits in the central cluster contained abundant naked barley grains, with large pit C2537 containing 472 grains, pit C2736 containing 388 grains, and pits C2740 and C2368 containing 108 and 106 grains respectively. These features may represent features associated with processing grain or cooking. Naked barley was found in a further 14 features in this group. Naked barley grains from six features were radiocarbon-dated and the results confirm that barley was being cultivated within the second half of the 4th millennium cal BC (and possibly just into the early 3rd millennium cal BC). The smaller quantity of emmer wheat from this pit group suggests this cereal type was grown as a secondary crop to naked barley.

There are small numbers of wild taxa present within the assemblage, such as common hemp nettle, bush vetch, mustards and pale persicaria, which are indicative of arable ground (Clapham et al 1962). It is likely the wild taxa were accidentally collected with the grain during harvesting and that they slipped through the processing stage, being smaller or the same size as the grain. Plants such as pale persicaria are common weeds of arable land (Stace 1997) and can grow up to 80cm in height (Hanf 1983), suggesting that the seeds of such plants could become incorporated with the cereals during harvesting. Alternatively the cereals could have been uprooted by hand, with weed growing around the base of the plants becoming incorporated with the harvest. The presence of sedge nutlets is suggestive of damp ground and this may reflect poor drainage conditions of the early fields where the cereals were grown.

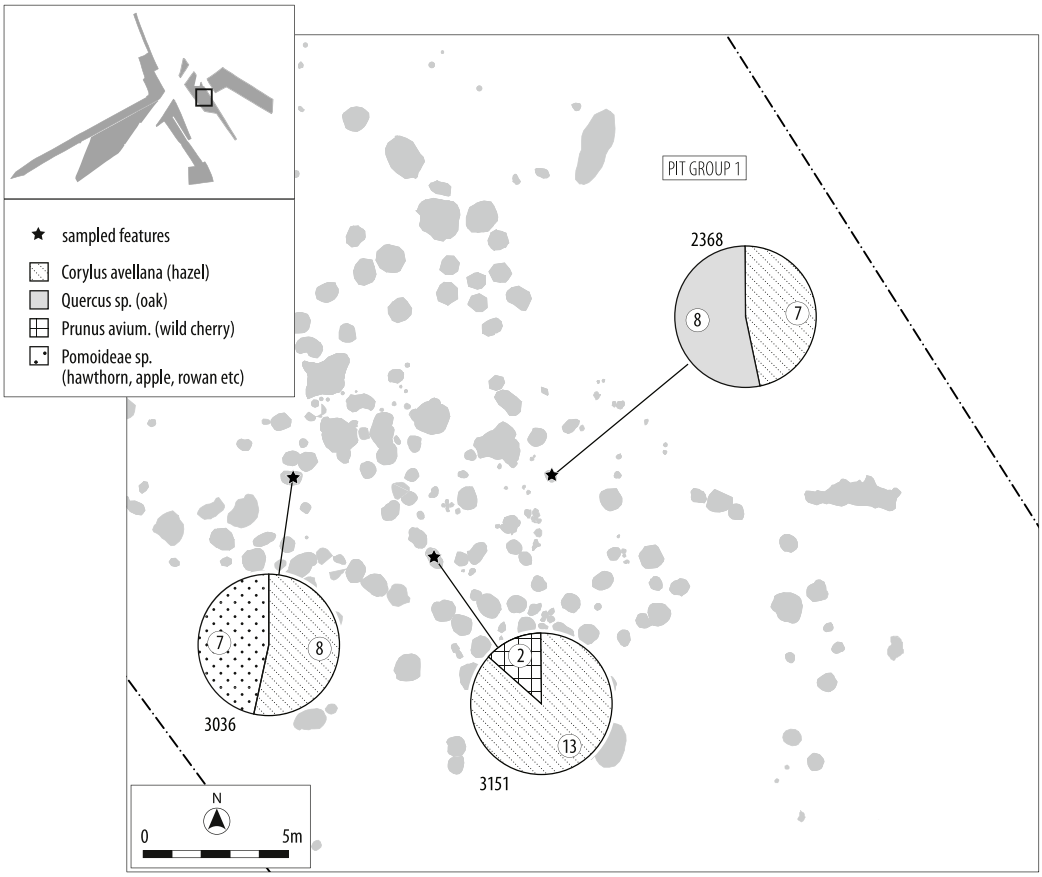
Hazelnut shell fragments are present within a number of the Pit Group 1 features, though not in the same quantities as found in earlier pit C2753 (for which, see 3.6, 'Charred plant remains from the Early Neolithic and Early to Middle Neolithic features' above). Hazelnut shell fragments from pit C2308 have produced a radiocarbon date of 3360–3095 cal BC (SUERC-16890), indicating that the activity utilising hazelnuts took place at the same time as the cultivation of the barley. Thus a mixed economy of agricultural and wild foodstuffs is inferred from the plant macrofossil assemblage (cf Bishop et al 2009).

Charcoal analysis was undertaken on samples from pits C2368, C3036 and C3151 (Illus 28). The assemblage is dominated by hazel charcoal together with significant amounts of oak. Smaller quantities of wild cherry and alder are also present. Pomoideae sp (hawthorn, apple, rowan etc), was found only in pit C3036, which contained mixed Neolithic and Bronze Age finds – see 5.5, 'Bronze Age stone artefacts' below – and thus may belong to either period. Pit C3036 still contained a majority of hazel charcoal, more in keeping with Neolithic than with Bronze Age features. The assemblage in general indicates that dryland woodland was being exploited for fuel. The ring data from the charcoal fragments suggest that people were selecting small branch wood from the hazel trees, with fragments having 3–14 rings. This is also likely to have been the case for the wild cherry, with fragments having 6–7 rings. Smaller pieces might have been used in construction, for example in wattle-work, as well as for fuel. The fragments from alder, oak and Pomoideae sp may have been a mixture of heartwood (eg trunk wood) and branch wood, with these fragments having 6–21 rings.

Charcoal analysis was also undertaken on a sample from pit C2419 (not illus) to the south-west of the later Structure 6, and the assemblage suggests that this is of an earlier date than the structure. The charcoal is devoid of oak and largely consists of hazel and alder with Pomoideae also present. This assemblage resembles those from Pit Group 1.

4.7.2 Pit Group 2

The Pit Group 2 assemblage was very limited by comparison. Excluding charcoal, charred plant remains were found in only two pits (C3945, C3949). Only two grains of naked barley were recovered and one of emmer wheat. Hazelnut shell was more common, but only totalled 11 fragments between the two pits. This limited assemblage, with small numbers of grains and nutshell fragments present within these post holes, makes it unlikely that the Pit Group 2 area was used for the storage or processing of foodstuffs. Those that are present



Illus 28 Charcoal from Middle Neolithic Pit Group 1. © Headland Archaeology

could have been transported to this part of the site from elsewhere or, in the case of the nutshell fragments, could have been attached to fuel wood.

4.8 Discussion and synthesis of the evidence for Middle Neolithic activities

Alison Sheridan, Julie Franklin, Elizabeth Jones, Scott Timpany, Sarah-Jane Haston & Laura Bailey

The evidence for Middle Neolithic occupation at Meadowend Farm is significantly more abundant than that relating to earlier occupation during the 4th millennium, with the clusters of pits and other features suggesting three foci of activity which could have been in contemporary or overlapping use, to judge from the consistency in their pottery and from the radiocarbon dating of Pit Groups 1 and 2. While no unequivocal evidence for house structures was found – with the degree of truncation meaning that any floors will long ago have been destroyed – nevertheless there were hints that such structures could have existed, as in the central cluster of Pit Group 1, where daub, suggesting the possible former presence of wattle and daub walling, was found in the fill of Pit C3091, beside a hearth. (Further small fragments of what could be burnt daub or burnt potter's clay were found in pit C2122, some 16 metres away in Pit Group 1.) The absence of clear patterns of post holes or beam slots need not argue against the presence of houses, since, as has been shown at another Middle Neolithic settlement at Sewerby Cottage, Bridlington (East Yorkshire) where, unusually, floors survived, houses could be constructed in such a way as to leave few traces cut deep into the ground (eg using turf walls and wattlework, Fenton-Thomas 2009: 78–88, especially fig 88; see also ScARF 2012b regarding changes in house construction over the Neolithic in Scotland). As for the temporality of the occupation, the intercutting of some features in Pit Group 1, including the insertion of a post into the aforementioned pit C3091, suggests sustained activity. At any rate,

there is clear evidence that people were storing, cooking and consuming food here, and depositing waste from their hearths into pits. The grains of naked barley and emmer found in some of the pits suggest that cereals were being cultivated in the vicinity (as discussed below), while the presence of ruminant dairy fat traces in several pots shows that domestic animals were continuing to be kept for their secondary products as well as for meat. The location of the Middle Neolithic features, on fairly level, well-drained soil, close to a water supply, would have been a suitable location for agro-pastoral farming.

The presence of an axehead made of Creag na Caillich calc-silicate hornfels, the source some 70km distant, suggests that the inhabitants, like their predecessors, were connected to the wider world by means of exchange networks. Whether the axe- or adze-head roughout made from trachyandesite, originating around 20km away in the Ochils, had also been obtained through exchange or by direct procurement, is unclear.

Regarding the presence and exploitation of woodland in the area, the charcoal assemblage (Illus 28) shows that hazel was the dominant taxon utilised at Meadowend Farm. Oak was also prominent in the assemblage, which also contained smaller quantities of Pomoideae, alder and wild cherry. The charcoal assemblage indicates the presence of probable oak–hazel deciduous woodland around the site during the Neolithic, which was exploited for fuel. Pollen diagrams from across central Scotland show that this oak–hazel woodland was the dominant form of woodland cover during the Neolithic and into the Bronze Age (eg Boyd 1986; Bennett 1989; Whittington, Edwards & Caseldine 1991; Tipping 2004). The dominance of hazel ties in with pollen studies from other Neolithic sites in Scotland (eg Tipping et al 2008), which show that hazel was a significant part of the vegetation, possibly even having formed pure stands of woodland.

As noted above, the large quantity of cereal grains recovered from Pit Group 1 indicates that farming was taking place somewhere in the landscape and thus woodland clearing would have taken place. How large a clearing this would have been is open to debate and is beyond the scope of this study. However, recent pollen work from an Early Neolithic 'hall' at Warren Field, Crathes, Aberdeenshire has indicated that arable cultivation during the Neolithic may have been more extensive than some had previously thought, with significant areas of land used for growing cereals (Tipping et al 2008). It is also worth considering here that the number of charred grains recovered at Meadowend Farm was greater than that of Crathes (approximately 840 to 570). There is evidence for Neolithic agriculture in pollen diagrams from central Scotland, such as at Black Loch (Whittington, Edwards & Cundhill 1991) and Pickletillem, north-east Fife (Whittington, Edwards & Caseldine 1991), both with similar dates to Neolithic activity at Meadowend Farm. It is suggested that the good representation for barley-type (*Hordeum* group) pollen in the sequence may represent forest farming in a regenerating woodland clearance (Whittington, Edwards & Caseldine 1991). This is of interest given the prominence of naked barley in the Meadowend Farm assemblage, from the Neolithic through to the Middle Bronze Age. Emmer wheat was also identified in the plant macrofossil assemblage but was present in much lower quantities. The use of naked barley during the Neolithic is well documented for Scotland, with grain of this species identified from excavated Early Neolithic buildings such as Garthdee Road, Aberdeen (Timpany 2014), Crathes, Aberdeenshire (Murray et al 2009), Lockerbie, Dumfriesshire (Hastie pers comm) and Balbridie, Grampian Region (Fairweather & Ralston 1993), and from the Early to Middle Neolithic settlement on Eilean Domhnuill, North Uist (Mills et al 2004). Naked barley is also present in the Early Neolithic assemblage from Claish, Stirlingshire; however, there emmer wheat was found to be the main cereal cultivated (Barclay et al 2002). The earliest dates for cereal cultivation in Scotland are from Crathes, Aberdeenshire (5015±35 BP, 3950–3700 cal BC, SUERC-10085, for wheat; 4945±35, 3820–3650 cal BC, SUERC-4034 for naked barley, Murray et al 2009; ScARF 2012a: 72). The presence of charred cereal grains within pits and post holes dating to the Neolithic is becoming an increasingly frequent find at Scottish sites. Similar findings have been observed at Drumchapel, Glasgow, where five barley grains were recovered from the fill of a Neolithic pit; hazel charcoal from the pit has been dated to 3349–2919 cal BC (GU-8810) (MacGregor & Cullen 2003). Charred naked barley grain was also recovered

from pits at Culduthel, Highland (Inverness-shire; Headland Archaeology in prep), with grain producing a date of 3650–3510 cal BC (SUERC-20229). Charred emmer wheat and hulled barley was also recovered from a pit at the nearby site of Alloa; the emmer was dated to 3640–3530 cal BC (Mitchell et al 2010).

As regards the four pits within Pit Group 1 that contained significant quantities of grain, it is conceivable that these had been grain storage pits. The storage of grain in pits dug into the soil is not uncommon in prehistoric societies (Hillman 1981) and results of experimental archaeology at Butser Farm (Reynolds 1979) have shown such pits to be effective methods for storage. However, the Butser pits were significantly larger, and effective storage involved a 'sacrificial' layer of germinated grain around the edges. In smaller pits this layer would have included a proportionately higher quantity of the contents and thus would probably not have been an efficient method of storage. The in situ burning suggests these might in fact have been features related to cooking.

Arguably the most significant aspect of the Middle Neolithic activities at Meadowend Farm is the very large amount of Impressed Ware pottery that was left behind. This is the largest and best-dated assemblage of this kind of pottery in Scotland, and as such it helps to define the ceramic repertoire of the Impressed Ware tradition in this part of Scotland, and to clarify its chronology. The definition and dating of Scottish Impressed Ware was reviewed in 2007 by Ann MacSween, who quoted Alex Gibson as explaining that this umbrella term, rather than the older term 'Peterborough Ware', is useful for 'uniting regional variants of a pan-British and Irish phenomenon' (Gibson 2002; MacSween 2007: 368; for descriptions of some of these variants, see Gibson 1995 for Wales, Manby et al 2003 for Yorkshire, and Sheridan 1995 for Ireland; see also Sheridan 2016 for an update on regional variability within Scottish Impressed Ware). The term is shorthand for a ceramic tradition, and it encompasses undecorated vessels, and those with non-impressed decoration, as well as those with impressed decoration. The Meadowend Farm assemblage finds specific comparanda in southern Scotland and northern England (including among Burgess's 'Meldon Bridge style' assemblages, Burgess 1976), and also more general comparanda among Middle Neolithic pottery in other parts of Britain and in Ireland. The latter include the use of the distinctive narrow-based trunconic shape, which is one of the defining features of what Isobel Smith termed 'Fengate Ware', a variant of 'Peterborough Ware' (Smith 1974). Quite why such an apparently unstable vessel shape should have been popular from southern England (eg at West Kennet, Wiltshire, Piggott 1962: fig 12) to at least as far north as Kintore in Aberdeenshire (Alexander 2000: illus 26) and westwards to the Glenluce sandhills (McInnes 1964: fig 9.162; Cowie 1996: fig 22) remains a mystery.

Other characteristics that are common to Middle Neolithic pottery over wide areas include the use of a variety of tools to make impressions; the use of thumbnail-pull or finger-pinch 'rustication' to roughen the surface; the manufacture of collared vessels featuring a 'cavetto' below the rim or collar; and the predominance of a laminar, flaky, coarseware fabric that breaks with a hackly fracture. This particular fabric, in which different materials are used as a filler in different regions, may relate to a specific way of preparing the clay, in which the creation of a compact, homogeneous, well-mixed paste (as seen in traditional CB pottery, for example) was not a priority.

Assemblages from southern Scotland and northern England that offer strong comparanda with the Meadowend Farm assemblage include Brackmont Mill, Fife (Longworth et al 1967), Balfarg Riding School, Fife (Barclay & Russell-White 1993), Meldon Bridge, Scottish Borders (Burgess 1976; Speak & Burgess 1999), Wellbrae, South Lanarkshire (Alexander & Armit 1993 and Cowie pers comm), Overhailes and Knowes Farm, East Lothian (Lelong & MacGregor 2007) and Thirlings, Northumberland (Miket 1976). Many other specific parallels for vessel shapes and/or decoration could also be cited, including from the nearby site of Alloa (Mitchell et al 2010). Here is not the place to discuss Impressed Ware variability on a region-by-region basis, or its evolution, since these have been discussed elsewhere (MacSween 2007; Sheridan 2016). Suffice it to say that the sharing of design ideas over large areas, with regional and local preferences, indicates societies that were linked within extensive networks of contacts –

something that is reflected at Meadowend Farm by the aforementioned presence of the Creag na Caillich axehead.

The dating of the Meadowend Farm Impressed Ware to *c* 3350–3000 cal BC is in line with dates for this pottery tradition, not only in Scotland (MacSween 2007; Sheridan 2016) but also in the rest of Britain (Gibson & Kinnes 1997). Gibson & Kinnes's end date of *c* 2500 cal BC for the entire tradition has recently been revised back to *c* 2900 cal BC by a reconsideration of all the currently available British dating evidence (Marshall et al 2009).

Finally, the fact that Impressed Ware is most usually found in pits has been interpreted by some as indicating that its deposition there resulted from acts of structured deposition (eg Barclay & Russell-White 1993: 166–8). While many now accept that rituals will have played a prominent role in daily life, it would arguably be unwise to over-emphasise the 'ritual' aspect of pottery deposition; in this case, it could simply be that the chosen method for disposing of household waste was by depositing it in pits, rather than letting it accumulate as a midden.

5. THE BRONZE AGE ROUNDHOUSES AND OTHER BRONZE AGE FEATURES, *c* 2150–*c* 900 CAL BC

Elizabeth Jones & Julie Franklin

There appears to have been a hiatus in activity on the site following the Middle Neolithic period, lasting the best part of a millennium between *c* 3000 and *c* 2150 cal BC. When activity picked up again, during the Early Bronze Age, once more it appears to be of a domestic nature.

Twenty-five radiocarbon dates dating to the Bronze Age were obtained from features on the site (Illus 29), and these have allowed the grouping of particular structures and features into three broad phases: Early Bronze Age (*c* 2150–1850 cal BC); Early to Middle Bronze Age (*c* 1750–1300 cal BC); and the Middle to Late Bronze Age (1300–900 cal BC).

The Early Bronze Age is characterised by a single identifiable structure, Structure 5, and by a series of isolated pits, all in Field 3. The Early to Middle Bronze Age phase is represented by Structures 1, 2 and 7 in Field 2 and Structure 8 in Field 3; of these, Structure 2 dates to the earlier part of this period and Structures 1 and 7 to the later part, while the chronological position of Structure 8 is less clear. The Middle to Late Bronze Age activity is represented by Structures 3, 4 and 6 in Field 3. The Bronze Age features and their relative locations are all shown in Illus 30.

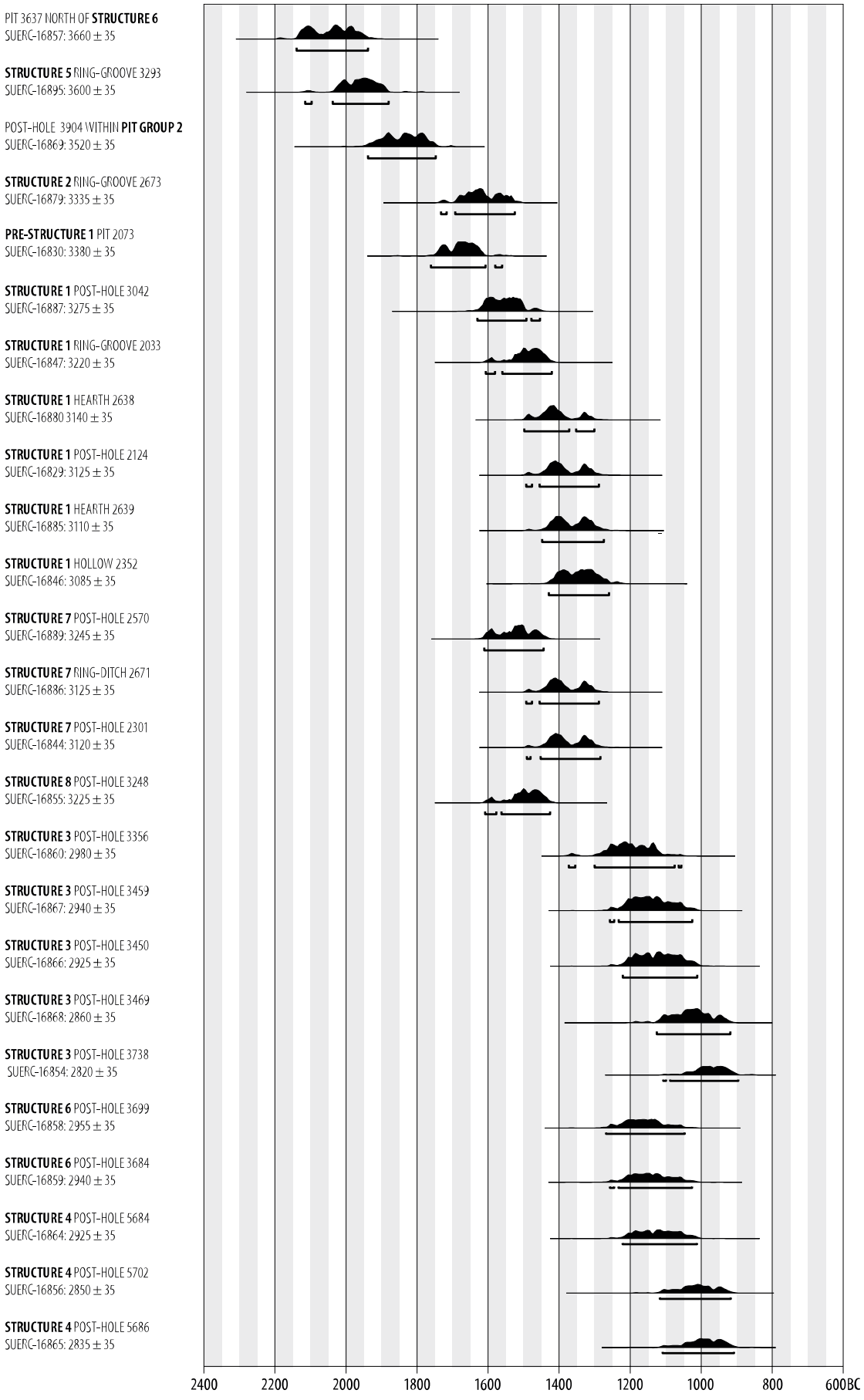
The artefactual and ecofactual finds from all of the phases of Bronze Age activity are described together after the structural evidence has been outlined.

5.1 Early Bronze Age 2150–1850 cal BC

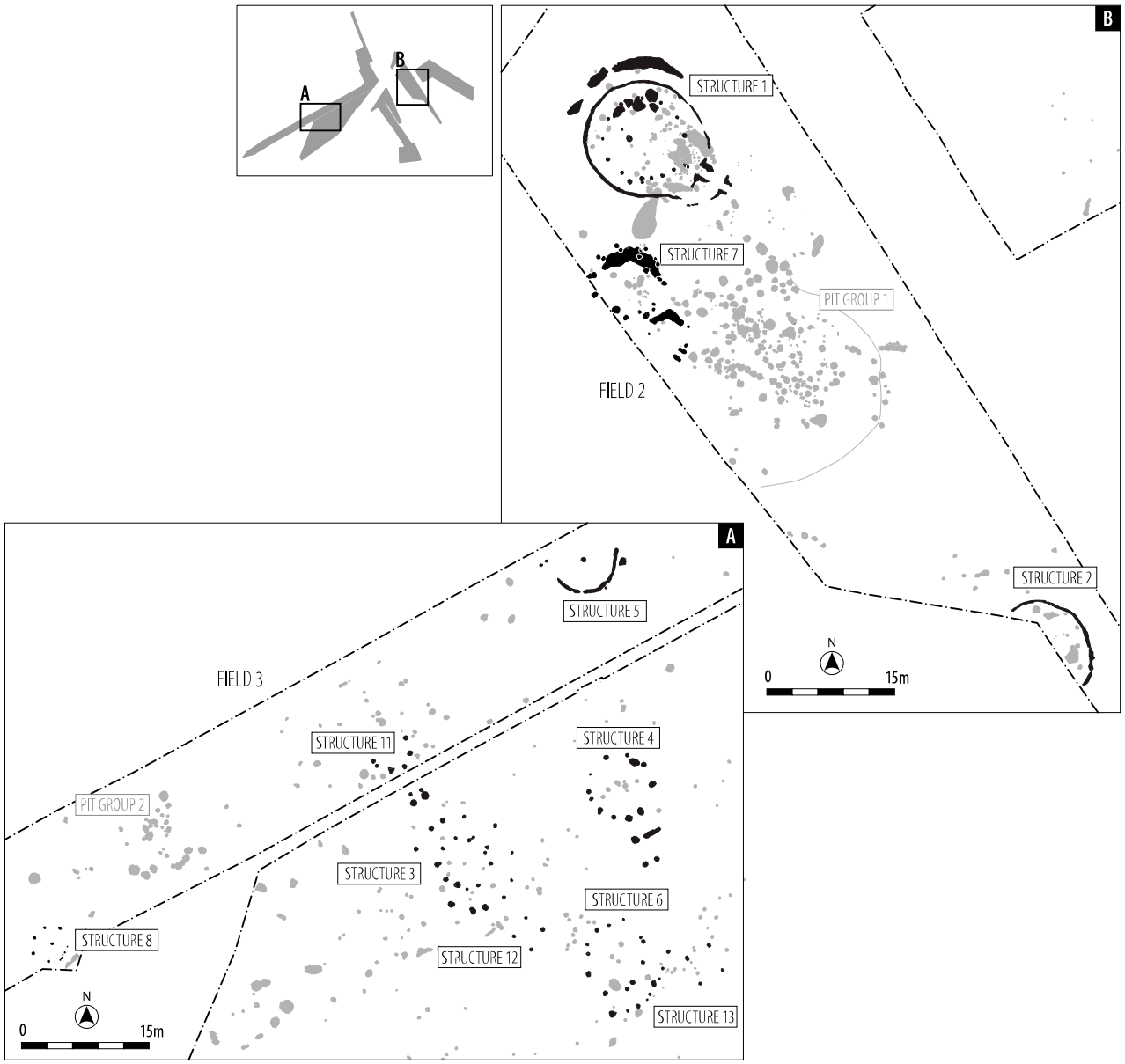
The remains of Structure 5 (Illus 31) consisted of a ring-groove, C3293, 0.35m wide and 0.15m deep, in the form of a discontinuous curving linear cut surrounding a central post hole C3306. The deposit within the ring-groove was charcoal-rich, suggesting that the building had probably burnt down. Occasional hulled barley and wheat grains were found within the fill, and alder charcoal from the deposit has been radiocarbon-dated to 2115–1880 cal BC (SUERC-16895). It may be that the northern half of the structure had been lost through plough truncation. The north-east segment of the ring-groove does not curve as strongly as the south-west part and it is possible that there had been an entrance on this north-east side and that the structure may have been oval rather than round. No finds were associated with this structure. A number of other small pits in the area appear to be associated with the structure, and several other features in Field 3 contained a scattering of Early Bronze Age pottery, or else returned potentially contemporary radiocarbon dates.

Pit C3637 was on the northern edge of Structure 6 (Illus 38), though it appeared to pre-date it. It was about 40m to the south of Structure 5 and hazel charcoal from the upper layer of its fill returned a date of 2140–1940 cal BC (SUERC-16857), similar to that from Structure 5. The pit measured 0.95m by 0.81m and was 0.38m in depth. It contained a layer of heat-fractured stones and charcoal overlain by a layer of mid-brown sandy silt with patches of charcoal and stones. No pottery was found within it.

Both pottery and charred hazelnut shell were found in post hole C3904. This feature was located within the spread of Neolithic Pit Group 2 (Illus 14) but appears to post-date it. Again it was in



Illus 29 Bronze Age radiocarbon dates. © Headland Archaeology



Illus 30 Bronze Age structures. © Headland Archaeology

the same broad area as Structure 5, and was about 60m to its south-west. It contained an apparent post-pipe of organic-rich material. Hazelnut shell from the post-pipe returned a date of 1940–1750 cal BC (SUERC-16869), potentially contemporary with Structure 5. As noted above, the pots (P233, P234, not illus) are probably Bronze Age, although the cylindrical jar P234 has comparanda that are of Middle, rather than Early Bronze Age date, so there is an apparent disjunction with the radiocarbon date.

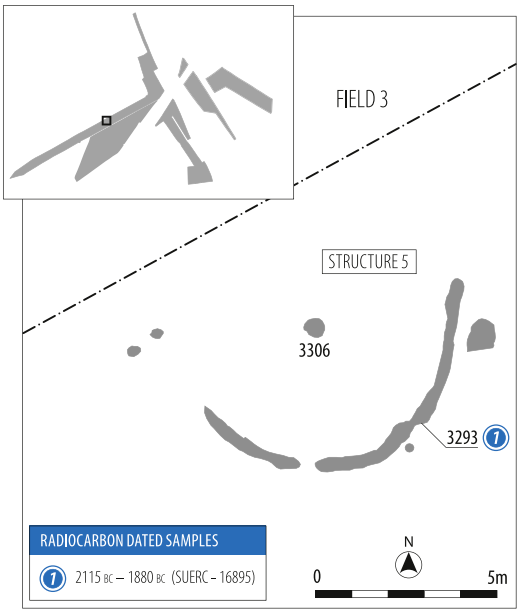
An upturned, nearly complete decorated jar (P236, Illus 32 & 40), plus large sherds from a second flat-based pot (P237, Illus 40), were found in pit C5722 (Illus 32 & 39) about 50m to the south-west of Structure 5, close to the later Structure 3. The pit measured 0.9m by 0.7m and was 0.2m deep with vertical sides. It had a single fill of dark brown silty sand with few inclusions. As discussed below, the attribution of these pots to a pre-1600 Early Bronze Age date is tentative; a date around or shortly after 1600 cal BC is equally or more likely.

Isolated pit C3549 (Illus 39), to the south of this, contained sherds from two possible Beakers (P228, P229, not illus). The pit measured 0.62m by 0.5m and was 0.12m deep with frequent charcoal found within the fill. Possible Beaker sherds were also found in pits C3364 within Structure 3 (Illus

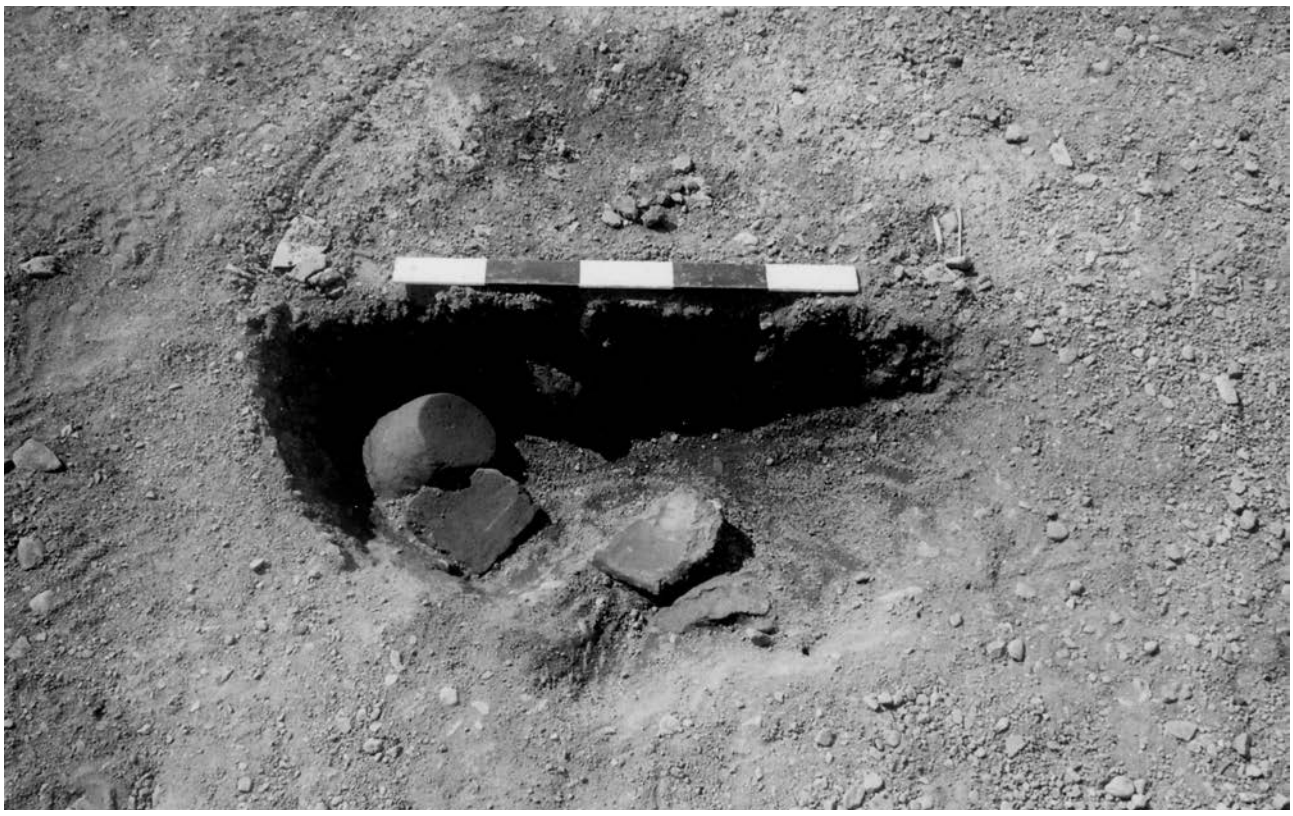
38), C3745 (not illus) and C3366 (Illus 38) (P230–P232, not illus). All these features lie *c* 80m to the south-west of Structure 5 in Field 3.

5.2 Early to Middle Bronze Age c 1750–1300 cal BC

The earliest identifiable structure in Field 2 was Structure 2 (Illus 33). It comprised a discontinuous ring-groove, C2673, 0.26m wide and 0.1m deep, with poorly preserved stake holes in the base. It more closely resembled part of a roundhouse than the rather elongated earlier Structure 5, though as it continued to the west of the excavation limits, the full form of the structure was not apparent. Extrapolation from the surviving features suggests that the ring-groove would have measured 12.2m in diameter. Post holes C2014, C2773, C2846 and C2844 and the post hole at the west end of C2749 (an oval post hole) may have formed a post-ring inside the ring-groove of Structure 2. The post holes were 0.4–0.6m in diameter and filled with homogeneous gravelly silt. They were 0.14–0.37m in depth, although the shallower post holes coincided with the location of furrows and had been truncated. Traces of a possible earlier structure in



Illus 31 Early Bronze Age Structure 5. © Headland Archaeology



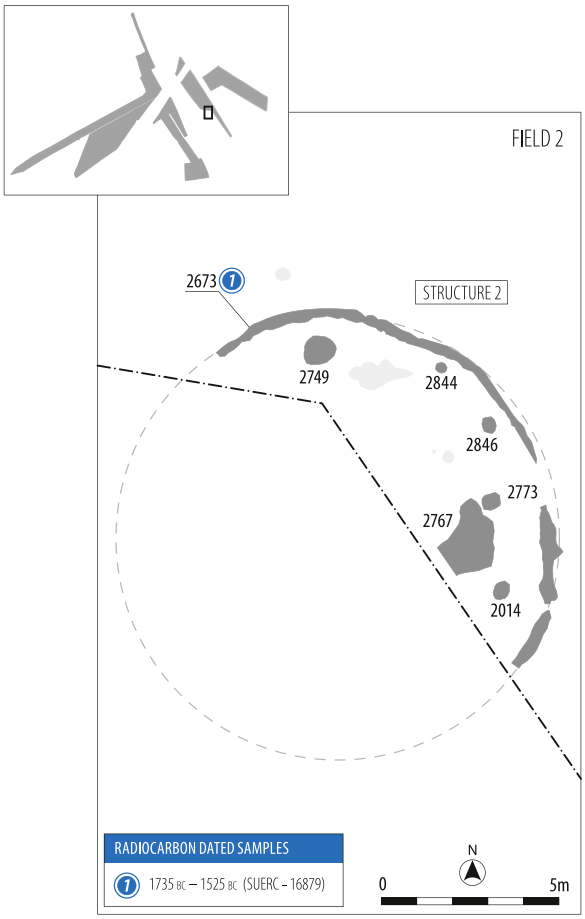
Illus 32 Isolated pit C5722 with early Bronze Age vessel P236 in situ. © Headland Archaeology

the same location were indicated by a thin smear of soil on the outer northern and inner south-eastern edges (not illus). There were also shallow pits inside the area bounded by the ring-groove, with one of these, C2767, filled with dark brown silt and charcoal which spread over the adjacent post hole and appeared to be occupation material. Pottery was recovered from this pit (P238, Illus 40), though it can be given only a tentative Early Bronze Age date. The fill of the ring-groove contained cinder and possible roundwood charcoal. Hazel charcoal from the ring-groove was radiocarbon-dated to 1735–1525 cal BC (SUERC-16879).

Structures 1 and 7 (Illus 34), about 60m to the north-west, appear to be later than Structure 2, although the dates overlap at the 68.2% probability range (Table 1). Structures 1 and 7 appear to be broadly contemporary. Both display clear evidence of two phases of activity, though it is not easy to determine the duration of each phase or to identify all the structural features that relate to each phase.

The earliest features within Structure 1 are a series of large pits towards the north of the interior, all over 1m in diameter and around 0.1m in depth, with fills all rich in charcoal and ash. Small amounts of wheat and barley were recovered from pit C2292, and pits C2290 and C2294 contained hazelnut shell, suggesting that this area may have been used for cooking or deposition of hearth material. Hazel charcoal from pit C2073 has been dated to 1760–1560 cal BC (SUERC-16830); this pit also contained a sherd of Early Bronze Age (pre-1600 cal BC) pottery (P235, not illus). Charcoal from the pits was predominantly alder, with some hazel. These seem to be contemporary with the use of Structure 2 and may well relate to the occupation of the earlier house *c* 75m to the south-east and pre-date the construction of Structure 1 entirely.

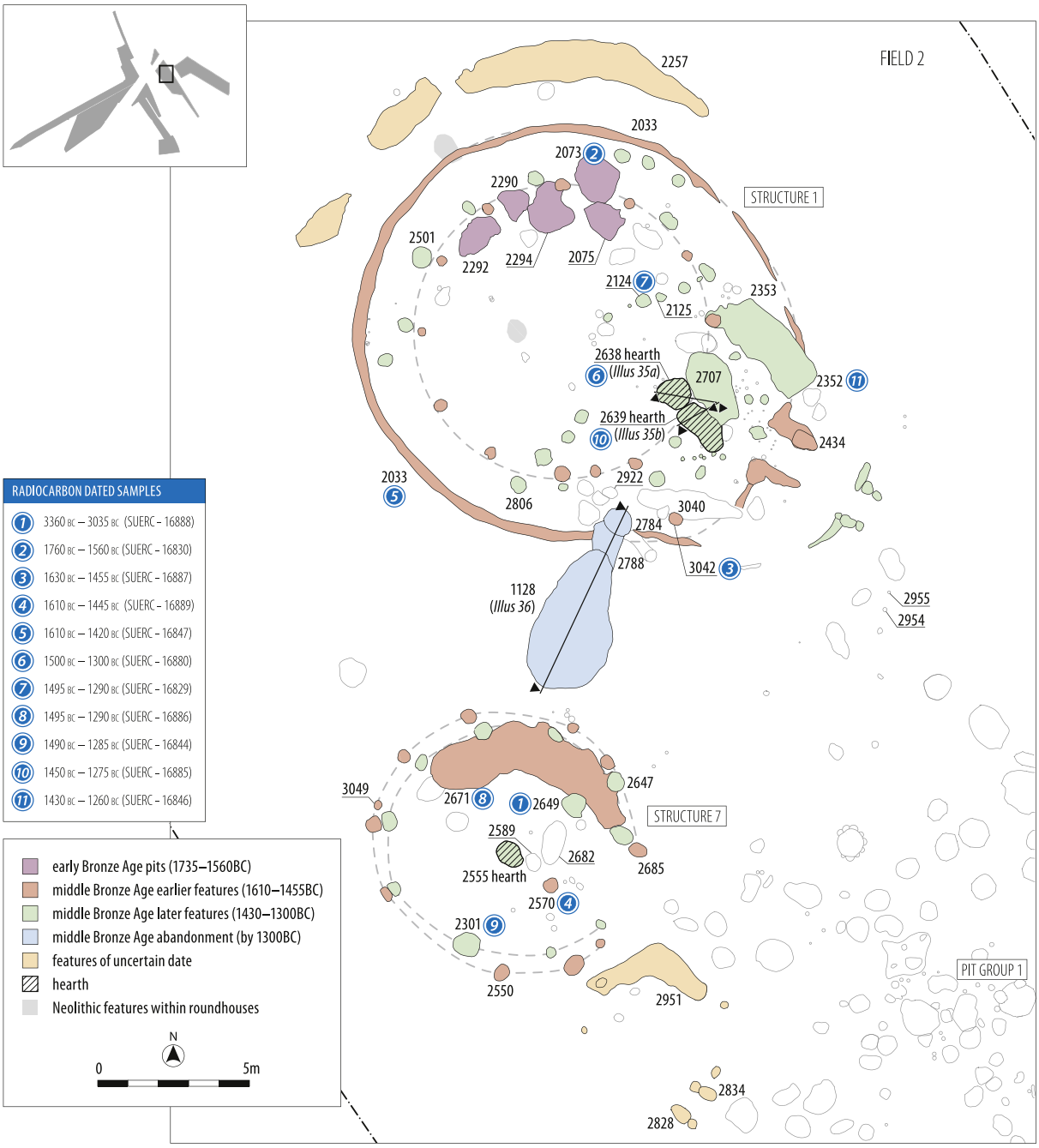
The remaining six Structure 1 dates provide a sequence from 1630–1455 cal BC (SUERC-16887, hazel charcoal from post hole C3042) to 1430–1260 cal BC (SUERC-16846, alder charcoal from a working hollow C2352). Given the evidence for two phases of building at Structure 1, it is possible to see two phases in the dates, with SUERC-16887 and SUERC-16847 falling within the second quarter of the 2nd millennium and the remainder (SUERC-16880, 16829, 16885 and 16846) falling within the third quarter of that millennium (Table 1). The



Illus 33 Early Bronze Age Structure 2.
© Headland Archaeology

two most secure dates were those from the hearths (C2638, SUERC-16880; C2639, SUERC-16885), from barley and alder charcoal that might relate to the function of these features. Both are well within the range of the remaining Structure 1 dates, with just 30 radiocarbon years between them.

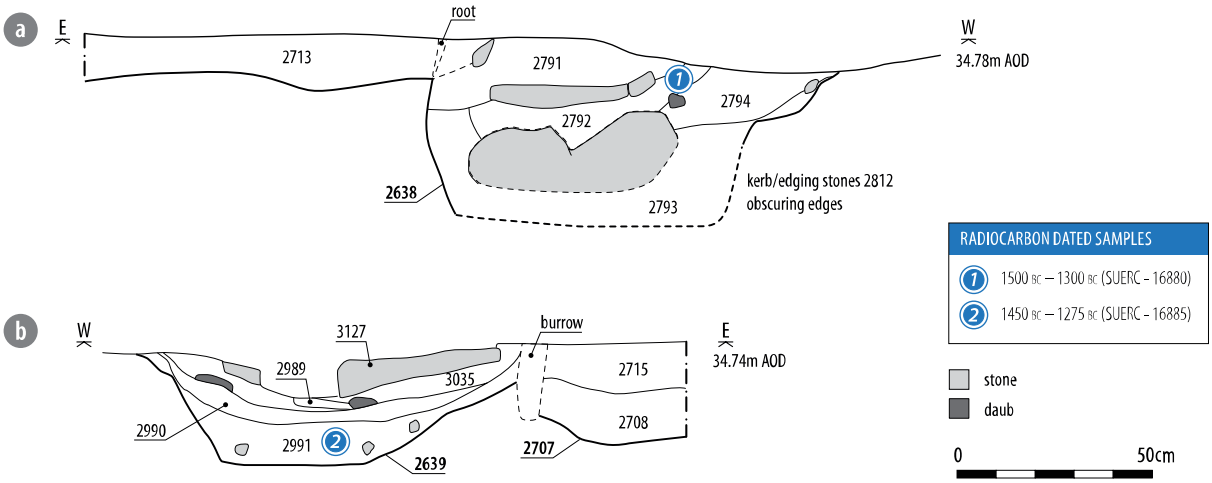
The roundhouse comprised an oval ring-groove measuring 15m by 13m, with an internal ring of post holes and a south-east facing entrance (Illus 34). The ring-groove C2033 varied in width and depth around its circumference due to truncation by plough furrows, but was up to 0.50m in width and up to 0.55m in depth, with the deeper parts tending towards the termini. Evidence for post-pipes was found in the western terminus but was not seen elsewhere, suggesting the use of split planks set close together. The fill also varied, from dark brown charcoal-rich silt to light brown sand. Burnt grains



Illus 34 Middle Bronze Age Structures 1 and 7. © Headland Archaeology

of sedges were recovered from the eastern half of the ring-groove as well as charcoal. The latter provided one of the earlier dates for the structure (1610–1420 cal BC, SUERC-16847). Charcoal from the fill of the ring-groove was predominantly oak, with smaller quantities of alder, hazel and Pomoideae sp.

There appear to be two successive phases of post-ring within the ring-groove. The first is circular, lying about 2m inside the ring-groove. Some of the post holes on the northern edge contained charcoal and suggested that this part of the building had been affected by fire. The rebuild involved a new set of posts on approximately the same circumference as the original but for the south-eastern side, where it extends outwards from the circle, creating an ovoid shape. This seems to have also involved the remodelling of the entrance. There were also stake holes and post holes on the inside edge of the northern and western sections of the ring-groove, perhaps indicative of repairs



Illus 35 Sections of hearths C2638 and C2639 within Structure 1. © Headland Archaeology

to or reinforcement of the upright timbers of the outer wall.

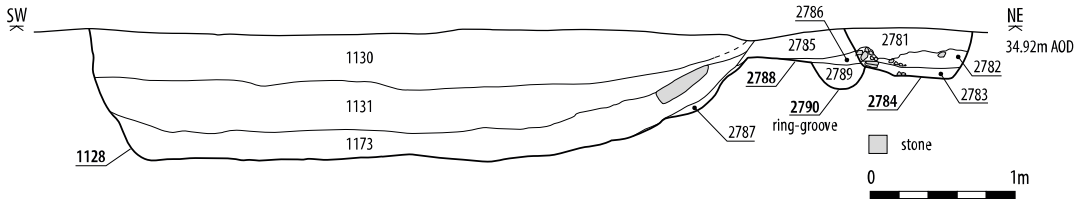
No central hearth was in evidence, though it is possible that this was raised above floor level and has left no archaeological trace. There were two successive hearths near the entrance (C2639, C2638, Illus 34, 35), both of which must relate to the rebuild as they cut through the line of the earlier post-ring. The earlier southern hearth C2639 was an unlined pit, and alder charcoal from the charcoal-rich silt at its base (C2991) returned a date of 1450–1275 cal BC (SUERC-16885). The hearth also contained fragments of fired clay and charred hazelnut shell. The proximity to the entrance might indicate the need to draw in air or light for processes undertaken there. An east/west line of stake holes immediately to the south of the hearth probably supported a wattle and daub partition which may have further served to channel in air to the hearth. Adjacent to this to the east was a working hollow C2707. This was filled with a mixture of material derived partly from the hearth, and fragments of fired clay which may have derived from the partition.

The northern hearth, C2638, was deemed later as it appears to cut hollow C2707 (Illus 34 & 35). It was lined with sandstone slabs, and a slab placed over the earlier hearth (C3127) may have formed an adjacent working surface. A series of firings each left fired clay, with charred barley grains being recovered from the final firing deposit, C2792. The barley returned a date of 1500–1300 cal BC (SUERC-16880). A sandstone slab had been placed on the hearth before it was abandoned.

The hollows on the eastern side of the entrance, C2352 and C2353, appeared to have been formed through wear or the sweeping out of frequently used areas; the dearth of finds recovered from the building may indicate that the house was kept clean. Fired clay was found within hollow C2353, presumably derived from a wattle and daub screen indicated by stake holes in its base. The latest date for the house, 1430–1260 cal BC (SUERC-16846), was returned for alder charcoal within this hollow.

The central area was divided by a line of pits and post holes, which ran roughly across the front third of the roundhouse. These divide the hearths and working area from the rest of the structure. A break in the middle of the line might have formed a doorway between the two 'rooms'. One of these post holes, C2124, contained charcoal with a similar date to those for the hearths, 1495–1290 cal BC (SUERC-16829). Several pits were found between the post-ring and the ring-groove. Several features contained pottery, charcoal and fired clay.

The curving hollow, C2257, on the northern side of the Structure 1 was undated, containing no finds, but its location concentric to Structure 1 means it must be contemporary with it. It was ill defined, with a gradual break of slope, gently sloping sides and a curving base, and was only 0.1m deep. It may represent an area worn away by runoff from the roof, or a more deliberate cutting to aid drainage, or



Illus 36 Section of pits cutting Structure 1 ring-ditch. © Headland Archaeology

possibly the external shadow of a turf wall around the building.

Structure 7, about 6m to the south, comprised a ring of post holes and an associated ring-ditch surrounding a central hearth (Illus 34). Assuming that it was of similar construction to Structure 1 it would have been only slightly smaller than that house, its post-ring diameter being 9m to Structure 1's 10m. There was no evidence for a ring-groove at Structure 7, though this may have been lost through subsequent truncation of the old land surface. Alternatively the outer ring may have been of turf construction, leaving no archaeological trace. It too had a south-east facing entrance and, as at Structure 1, two clear phases were present. The earlier phase is represented by the broader of the two post-rings. Maintenance over its life is indicated by an additional post hole, C3049. It was rebuilt on a slightly smaller scale with an 8m post-ring roughly concentric with the original line and in some cases directly cutting the earlier features. Large amounts of charcoal were recovered from a number of these second-phase post holes, although this may be residual from the earlier phase. The predominant timber was alder, with smaller quantities of oak and hazel.

Barley from one of the post holes of the later post-ring (C2301) returned a date of 1490–1285 cal BC (SUERC-16844), contemporary with the second phase of Structure 1. No datable material was recovered from the earlier ring, though an internal post hole, C2570, contained alder charcoal which dated to 1610–1445 cal BC (SUERC-16889), which is contemporary with the first phase of Structure 1. The two structures do therefore seem to have been occupied in tandem during both phases.

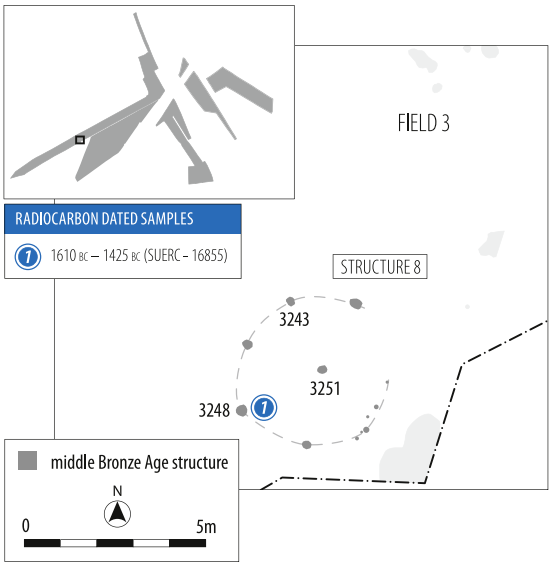
The ring-ditch C2671 was confined to the northern part of this structure and was up to 1.4m wide and 0.19m deep. It contained charcoal, dating to 1495–1290 cal BC (SUERC-16886), but little artefactual material. There were several pits inside the structure, with one of these (C2682) containing very large amounts of charred barley grain, suggesting that the area had been used for storage or food processing. Pottery was found in three of the post holes, C2570, C2647 and particularly C2301, which contained a substantial quantity (67 sherds) of a single pot, P251 (Illus 41). The central hearth, C2555, was set on a base of flat, fire-cracked stones, although there was very little charcoal remaining. The remains of a burnt post, C2589, were found in a feature to one side of the hearth, which also contained daub, pottery and small quantities of burnt grain. Stake holes inside the entrance may represent an internal division or a series of structures set close to the entrance in order to use the light coming through the door. One of the internal features, pit C2649, cut through the ring-ditch and thus probably belongs to the later phase of Structure 7. Barley within it returned a Neolithic radiocarbon date of 3360–3035 cal BC (SUERC-16888) but this must represent residual material deriving from activity associated with Pit Group 1 directly to the south-east.

A small L-shaped gully, C2951, immediately south of Structure 7 may represent the southern part of a porch entrance to Structure 7, along similar lines to that seen in Structure 1. No dating evidence was retrieved from the gully to tie it to either phase, however. Features C2834 and C2828 are also undated but might form an entrance way to another structure, now largely lost and presumably pre-dating Structure 7.

A large pit, C1128 (Illus 34 & 36), located between Structures 1 and 7, contained a significant pottery assemblage. The pit was 4.5m by 2.7m wide

and 0.9m deep. It had lain open for some time, with indications of erosion of the sides and natural silting taking place in antiquity. Over 500 sherds of Middle Bronze Age pottery representing at least 37 vessels were recovered, mainly from the upper fill (C1130) of the pit (P252–P286, Illus 41), with only one vessel from middle fill, C1131, and another from lower fill C1173 (P287 and P288 respectively, Illus 41). Pit C1128 seems to have been used for the dumping of domestic waste, and the fact that the pottery resembles that found in both Structures 1 and 7 suggests that there might not have been a significant time gap between the occupation of these structures and the deposition of the pottery in the pit. Its stratigraphic relationship to Structure 1 is, however, tenuous. The north-eastern end of the pit cuts a smaller pit (C2788), which in turn cuts the outer ring-groove of Structure 1, though the stratigraphy is very shallow at this point. Nevertheless, there is a clear implication that the pit post-dates Structure 1. Its proximity to the inner post ring of Structure 7 also implies that it would have cut its outer walls, and thus must also post-date that structure. Therefore, even though the pottery itself may have been used within the structures, on stratigraphic grounds its deposition in the pit cannot be contemporary with their occupation. It could be that, on the abandonment of Structures 1 and 7, occupation shifted immediately to another nearby roundhouse just outwith the excavation area, with this being the source of the waste pottery. The pit may have been cut to extract materials for its construction and was subsequently filled with waste material from the general occupation of the area.

Structure 9, at the eastern edge of Field 3 (Illus 3), some 50m to the south-west of Structure 7, might also relate to this group, although its dating is unclear. It comprised a shallow curvilinear ring-groove, partially ploughed out by furrows, and continuing outwith the excavated area to the east. A number of pits and post holes were found within and around the ring-groove. No pottery was found in any of these features. Alder charcoal from a post hole C2377 (not illus) to the south-east of the ditch's terminus was radiocarbon-dated to the Iron Age, 400–210 cal BC (SUERC-16849), although a medieval date was returned for grain from the ring-groove itself (SUERC-16877). The circular structure might be of Iron Age date, though with



Illus 37 Middle Bronze Age Structure 8. © Headland Archaeology

no other material from anywhere on site consistent with an Iron Age date, this material could well be intrusive, reflecting nothing more than low-level agricultural activity at the time. Structure 9 may be part of the same Bronze Age settlement as Structures 1 and 7, or it might belong to another phase of Bronze Age occupation.

Structure 8 (Illus 3, 30 & 37) was small and located some distance from the other contemporary roundhouses at the western edge of the excavation area in Field 3. It consisted of a post-ring approximately 4m in diameter around a central post hole, C3251. The post-ring was simply built and may have been open on the eastern side with a screen of stake holes partially protecting the open side from the elements. The post holes were of similar size and ranged from 0.22m to 0.35m in diameter and were 0.1–0.18m in depth. All except two showed evidence for a post-pipe, and one post hole, C3248, suggested the post had been burnt, possibly charred prior to use. Alder charcoal from this post hole returned a date of 1610–1425 cal BC (SUERC-16855). Although fragments of burnt bone were recovered from three of the post holes, these were not of sufficient size or quantity to aid the interpretation of the function of the structure. The only plant remains were a hazelnut shell found in post hole C3243.

While Structure 8 does not appear to be associated with any nearby structures, its date is contemporary with the first phase of occupation at Structures 1 and 7. The cluster of pits to the south-east at the edge of the excavation suggests a focus of activity in that direction. It may be that Structure 8 was associated with a larger roundhouse nearby to the south.

5.3 Middle to Late Bronze Age c 1300–900 cal BC

The Middle to Late Bronze Age activity is represented by two large double-ring roundhouses with elongated porches (Structures 3 and 4), an oval building (Structure 6) and a number of smaller, possibly ancillary, structures all clustered in the western part of the site in Field 3 (Illus 38). The structures formed a triangle spaced about 10m apart and were all broadly contemporary, potentially all dating to the later 12th and earlier 11th centuries cal BC.

Structure 3 comprised an inner post-ring and traces of an outer ring, presumably representing the outer wall, and appeared to have two entrances, one facing south-east, and one north-west, the latter towards Structure 11, a small single post-ring structure. To the south was the four-post Structure 12. A series of five radiocarbon dates from Structure 3 ranged between 1375–1060 cal BC (SUERC-16860) and 1110–895 cal BC (SUERC-16854), although it is likely the structure was occupied for a relatively short time within this range. It may be that repairs extended its use-life. The porch and inner ring produced dates early in the range (namely SUERC-16860 as cited above, and SUERC-16866 and SUERC-16867, the former of which gives a range of 1220–1015 cal BC), while one replacement post hole (C3738) and a post from the north-west entrance (C3469) produced slightly later dates, namely 1110–895 cal BC (SUERC-16854) and 1125–920 cal BC (SUERC-16868).

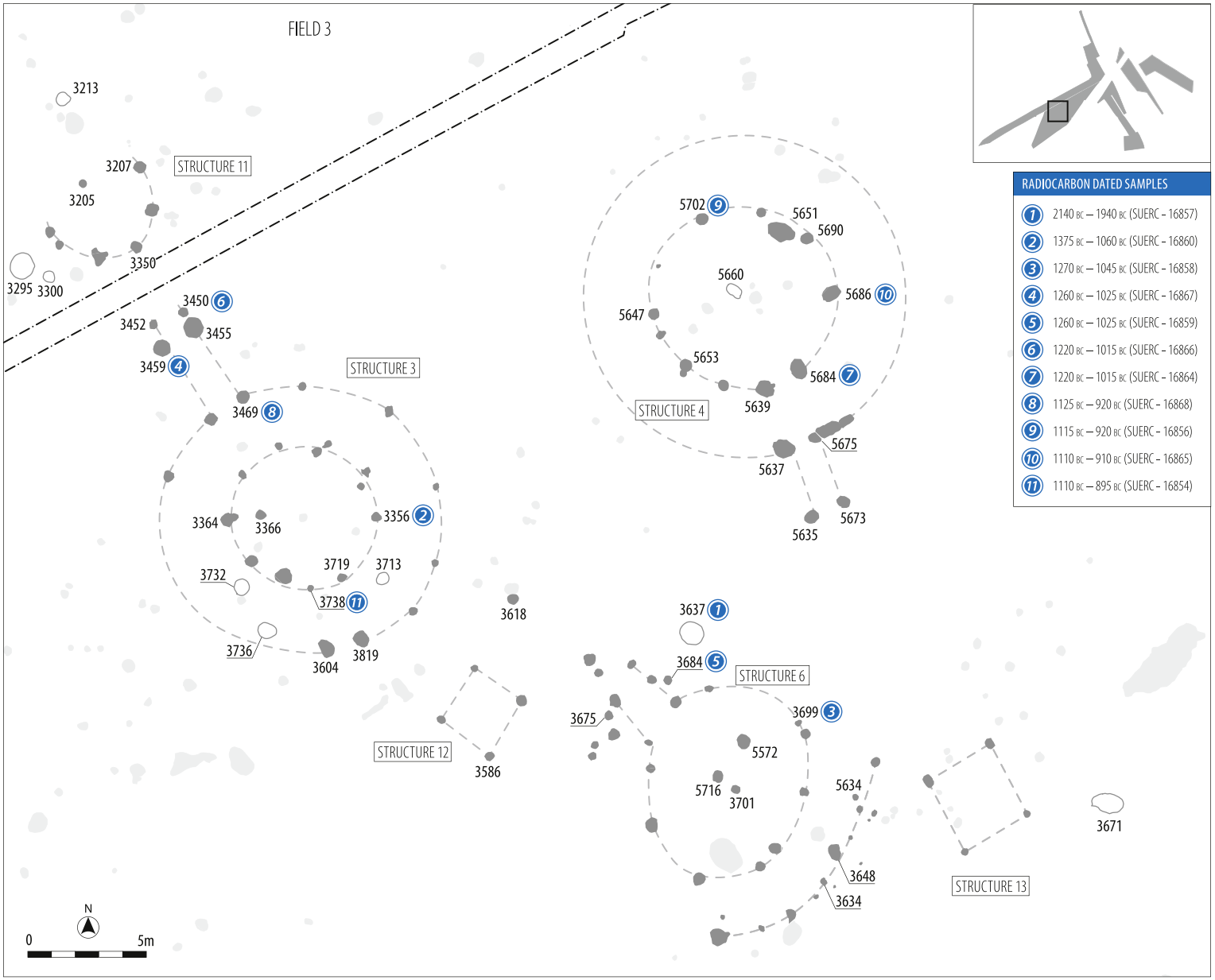
The post holes in the outer ring were arranged neatly, forming a circle 11.7m in diameter. The post holes on the south-western side were absent, but the eastern post holes were all less than 0.1m deep, suggesting those on the western side could easily have been lost through ploughing. Small quantities of charred barley and wheat grains were found in some of the post holes, probably reflecting accidental rather than deliberate deposition. The inner ring measured 6.6m in diameter and comprised nine posts, arranged symmetrically on a line running from post hole C3719 at the rear of the building through the centre of the porch at the north-west entrance. Repair was indicated by pairs of posts on the eastern side and the recutting of post hole C3364. The inner ring post holes varied in size but were larger on the western side, with the majority containing a single fill comprising mid- to dark brown sandy silt with little charcoal.

The porch at the north-west entrance comprised two sets of paired post holes. The larger post holes, C3455 and C3459, were 0.70–0.75m in diameter respectively and 0.23–0.26m deep. Post hole C3455 had a darker upper fill and C3459 a clear post-pipe. The two smaller post holes, C3450 and C3452, were on the outside of the larger ones, perhaps indicating that these had served to buttress the larger posts, or to support a gate closing off the outer end of the porch. They both contained single fills and were 0.39m wide and 0.20m deep. The north-western orientation of the entrance is unusual and the length of the porch would have almost entirely obscured direct sunlight.

The south-eastern entrance was less grand, or less well preserved, with no evidence of a porch. It was defined by larger post holes, C3604 and C3819, on the south-eastern side that were roughly oval, measuring 0.72–0.63m by 0.60m and 0.12–0.20m deep. Both contained deposits of dark blackish-brown silt with angular stones and gravel and occasional charcoal. The distinctive fills may be an indicator of activity around the entrance, including the repair of these posts, which may have been under more strain.

The two entrances were not directly opposite each other. The south-eastern entrance was in the same relative position as that of Structure 4 (see below). The north-western entrance, however, relative to the axis of the house, was offset slightly to the west.

A number of pits were found between the inner and outer rings on the southern side of the structure. Pits C3732 and C3713 were both 0.45m in diameter and filled with mid-brown sandy silt, similar to the fill of the post holes. They were 0.15m and 0.24m in depth. Pit C3736 was larger, measuring 0.80m by 0.60m and 0.34m in depth. No finds or environmental evidence were recovered from these pits to assist in identifying their function. No pottery was associated with the occupation of this structure.



Illus 38 Middle–Late Bronze Age structures. © Headland Archaeology

The four-post Structure 12 lay about 4m to the south-east. The post holes on the south-east side of the structure were larger, measuring around 0.45m in diameter and 0.25m in depth, while those to the north-west were around 0.32m in diameter and 0.17m deep. The structure measured 3m across. All the post holes were filled with homogeneous sandy silt with few inclusions.

Structure 11 was about 3m to the north-west of the end of the porch passage of Structure 3. It took the form of a group of six post holes forming a rough semicircle *c* 5m in diameter around a possible central post, C3205. The post holes were sub-circular and ranged from 0.40m to 0.55m in diameter and 0.14m to 0.30m in depth. One, C3350, contained frequent charcoal within its fill; no plant remains were recovered. A group of features at the north of the structure might represent pits associated with activities undertaken in the shelter or structure at the entrance. One of the pits (C3213) contained large quantities of charcoal and so may have been used for the disposal of hearth waste. A large hearth pit (C3295) was located to the west of the structure, and hazelnut shell fragments and small quantities of barley and wheat grains were found in the adjacent pit, C3300. This area outside the structure may have been used for cooking. More than one phase for Structure 11 is indicated by the presence of multiple/overlapping post holes. Although the structure is only a partial survival it seems to be paired with Structure 3 and may represent an annexe or ancillary building associated with Structure 3. The pits containing hearth waste may indicate an area for communal cooking. Various features around Structures 3 and 11 might represent ancillary structures such as animal pens, drying racks and small fenced areas, but no clear patterns were discernible.

Structure 4 was located to the east of Structure 3 (Illus 38). It was represented by a single post-ring, though the position of the porch post holes implies that this represented an inner ring rather than the outer wall. The outer wall may have been of turf construction or, given the evidence for truncation, its post holes might have been removed entirely. Three dates from the inner ring range between 1220–1015 cal BC (SUERC-16864) and 1110–910 cal BC (SUERC-16865). Its porch faced the more usual south-east. The porch post holes were roughly 0.6m in diameter, with the western one (C5635) 0.14m deep and the eastern (C5673) 0.06m deep, probably truncated through ploughing. A sherd of Middle to Late Bronze Age pottery was recovered from the former (P311, not illus). The entrance post holes (C5637, C5675) were substantial, measuring 0.86m and 0.55m in diameter respectively and 0.25m and 0.13m deep. Both were filled with mid- to dark brown sandy silt. The eastern post hole, C5675, was part of a line of four posts, which may have served to add extra support to the wall where it was under pressure from the roof timbers as well as a door.

The inner post-ring was 8m in diameter and was made up of 11 post holes, varying in shape and size but tending to be larger and deeper on the eastern side. Most of the fills were of homogeneous mid- to dark brown sandy silt with occasional charcoal inclusions. The quantity of grain found within the structure was small and may reflect general waste, perhaps from cooking rather than primary processing. An arc of five post holes running across the centre of the building may represent a partition. One of the pits along this line, C5660, contained burnt clay and charcoal and may represent the remains of a hearth.

Structure 6 was apparently oval in plan but was the least well defined of all the roundhouses and might in fact represent fragments of several superimposed houses rather than one structure (Illus 38). An oval inner ring measured 7.8m by 6.6m, and possible remains of an outer wall might suggest it was about 5m larger. Two similar dates appear to relate to the occupation of the building: 1270–1045 cal BC (SUERC-16858) and 1260–1025 cal BC (SUERC-16859).

The post holes were roughly 0.3−0.5m in diameter and were up to 0.3m in depth. They were generally filled with mid- to dark brown sandy silt with occasional charcoal and stones but little distinguishing the fills. Of the internal features, two post holes roughly in the centre of the structure may have acted as supports on either side of a fireplace on the original ground surface, which has not survived. Pit C5572, between this possible hearth area and the entrance, was the only feature containing plant remains, in the form of occasional charred barley. The pit was 0.68m in diameter and

0.38m deep, filled with mid-grey-brown sandy silt with occasional charcoal.

A group of post holes on the north-west side of the structure may have formed an entrance. These post holes are fairly substantial and are clearly structural with one (C3675) containing packing stones and another (C3684) burnt evidence for a post pipe. On the south-eastern side was a curve of small shallow stake/post holes parallel to the building. This may represent a partial enclosure or fence around the structure or perhaps the remains of an outer wall. Within this line, pits C3648 and C3634 contained evidence for food processing in the form of charred hazelnut shells and barley.

A small amount of undiagnostic pottery was recovered from post hole C3699 (P292, P293, not illus) and from the doorway (post hole C3684, P295, not illus).

To the east of the structure was another spread of post holes. A possible four-post structure, Structure 13, was identified among these, measuring 3.5m by 3m; a possible fence line ran north-eastwards from the corner. To the east of this was a substantial oval pit, C3671, 1.4m by 0.76m wide. No finds were recovered from the pit but the fills suggest that it had been left open for a time before being rapidly backfilled and may have been used for storage.

The post holes in this area seem to represent a demarcation of space. In contrast, the open area between Structures 4 and 6, with their opposing entrances, suggests that the two structures may have functioned together, with the space between used for working and socialising. The four-post structures and Structure 11 perhaps functioned for storage or stock management, while the annexe and possible fence line associated with Structure 6 presumably demarked areas for other functions.

5.4 Bronze Age pottery

Alison Sheridan

Parts of around 86 vessels of definite, probable and possible 2nd-millennium date were found, with at least 37 of these found in a large pit, C1128, cutting Structure 1 and most of the rest associated with Structures 1 and 7 in Field 2 and Structures 4 and 6 in Field 3 (Illus 39). Ten findspot contexts are associated with radiocarbon dates, and these define an overall chronological range of *c* 1950–900 cal BC, although unfortunately most of the pottery from the dated contexts consists of small, featureless body sherds. Fragments of fired clay found in hollow C2353 in Structure 1 may be remains of daub.

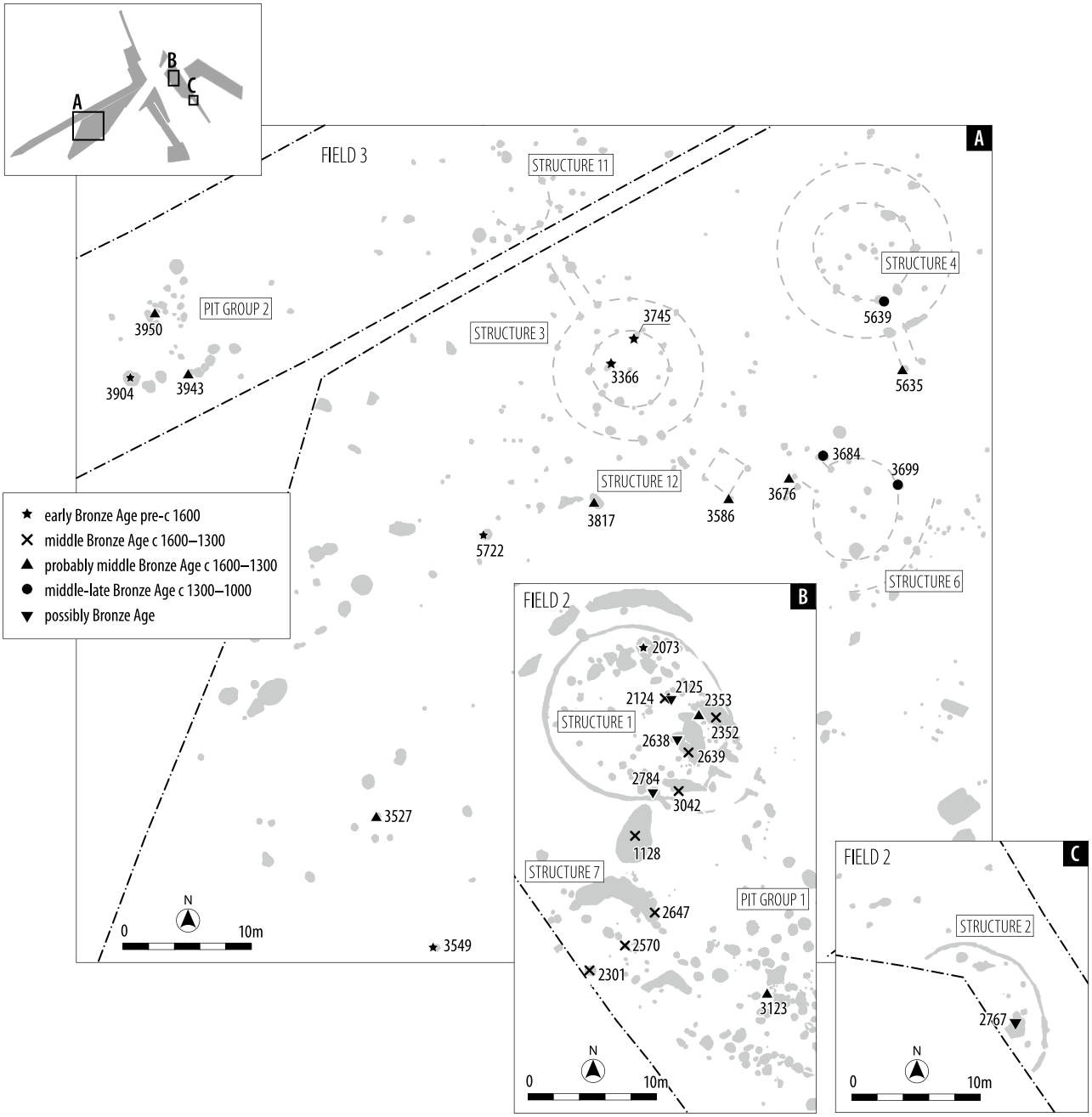
Most of the 2nd-millennium pottery can be divided into three chronological groupings, corresponding roughly to the periodisation of Bronze Age activity on structural grounds as outlined above: Early Bronze Age, pre-*c* 1600 cal BC; Middle Bronze Age, *c* 1600–1300 cal BC; and Middle to Late Bronze Age, *c* 1300–1000 cal BC. The remainder has been designated 'possibly Bronze Age', on the grounds of similarity in fabric, finish and (where discernible) form to pottery of definite Bronze Age date. In addition, an unusual, solid ceramic object has been tentatively included here as possibly being of 2nd-millennium date.

5.4.1 Early Bronze Age pottery (pre-1600 cal BC)

Only a small amount of pottery can be considered as potentially being of Early Bronze Age date. The findspots and material are diverse, and are best described individually.

Possible Beaker pottery (P228–P232, not illus) was found in isolated pit C3549 (Illus 39), post hole C3364 (Illus 38), and pits C3745 (not illus) and C3366 (Illus 38). This consists of a handful of thin-walled, fineware sherds, all undecorated and all abraded, with most of the findspots clustering to the east of Middle Neolithic Pit Group 2 and to the south-west of Early Bronze Age Structure 5. The thinness and fineness of this pottery contrasts with the pottery from Middle Neolithic and definite Bronze Age contexts, and is consistent with Beaker finewares, although the small size of the sherds, the impossibility of reconstructing vessel profiles and the absence of decoration preclude firm identification as such. (Indeed, an Early Neolithic date cannot entirely be ruled out, although these sherds do not match the traditional CB sherds from the site.) This is the only hint of potential Beaker use at Meadowend Farm, unless one accepts the possibility, albeit remote, that the curious, roughly cylindrical object from isolated pit C2654 (not illus) in the south-east of Field 3 is a leg from a Beaker polypod bowl (as discussed below).

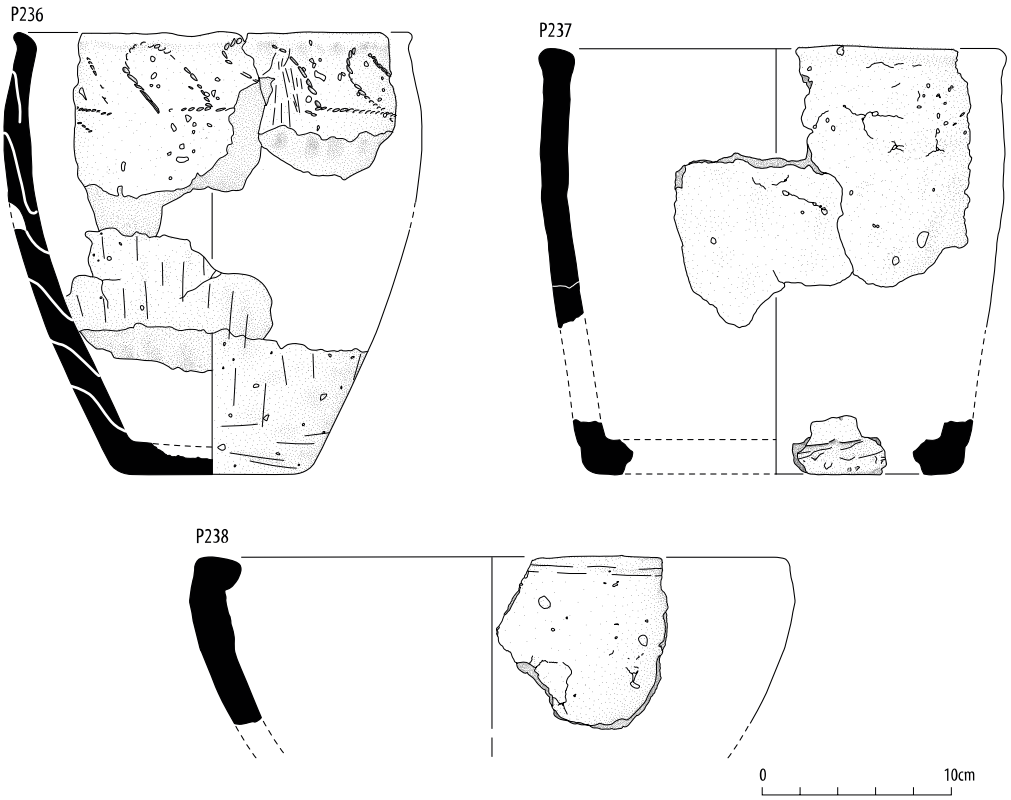
A pit, C2073, located within Structure 1 (Illus 34) but believed to pre-date it due to a



Illus 39 Bronze Age pottery distribution. © Headland Archaeology

radiocarbon date of 1760–1560 cal BC (SUERC-16830), contained a single, small, featureless body sherd that is singularly uninformative.

A relatively isolated pit, C5722 (Illus 39), contained over two-thirds of a decorated jar that had been deposited almost upside-down (P236, Illus 32 & 40), together with large sherds from a second pot (P237, Illus 40), an undecorated flat-based coarseware jar. P236 is a flat-based vessel, with rim and base diameters of 210mm and 100mm respectively and an estimated height of 235mm, whose walls splay gently, then curve in slightly to a rounded, minimally everted rim. This is the only Bronze Age pot from the site to have any decoration. The decoration consists of faint, looped impressions of twisted cord fringed at the bottom with a horizontal line on the upper, inturned part of the body, and a line of twisted cord impression on the rim bevel. Upon excavation, this pot fell apart along its coil joint planes, revealing that it had been



Illus 40 Early Bronze Age pottery. © Headland Archaeology

built up using six flattened rings of clay, added to a flat base plate. P237 is a plain, broad-based jar, with estimated rim and base diameters of 250mm and *c* 220mm respectively and an estimated height of 225mm. The attribution of both of these pots to an Early Bronze Age, pre-1600 BC date is tentative and is based on possible comparanda among Scottish domestic and funerary Early Bronze Age assemblages, as discussed below. As will be seen, a date around 1600 cal BC, or perhaps even slightly later, is equally possible.

Part of a large coarseware pot (P238, Illus 40) with a heavy, internally projecting rim was found in pit C2767 within Structure 2. It has a rim diameter around 310mm and a horizontally corrugated interior, from rough finger-shaping. Its overall profile cannot, unfortunately, be reconstructed. The ring-groove of Structure 2 is dated to 1735–1525 cal BC (SUERC-16879). Although this pot bears a passing resemblance to one or two of the undecorated Middle Neolithic coarse vessels (especially P106, Illus 18, from pit C2979, Pit Group 1), the facts that it was found inside an Early Bronze Age structure and that its findspot lies over 35m to the south-east of Pit Group 1 argue in favour of its probable Early Bronze Age date.

Finally, a potential mismatch between the radiocarbon date for post hole C3904 – 1940–1750 cal BC (SUERC-16869) – and the pottery found in that post hole has already been mentioned: a lower-body sherd from what had probably been a cylindrical jar (P234, not illus) finds its closest comparanda among the Middle Bronze Age pottery described below, while a large coarse pot of indeterminate shape (P233, not illus) is hard to attribute to a specific period.

5.4.2 The Middle Bronze Age pottery (1600–1300 cal BC)

The pottery that is definitely, or very likely, to be of Middle Bronze Age date comes from Structures 1 and 7 and from the large pit, C1128, which cuts the ring-groove of Structure 1. Parts of at least 52 vessels are present, with pit C1128 containing at least 37 of these. The fact that many of the sherds from this pit are large and unweathered, and that

large portions of individual pots are represented, matching those from Structures 1 and 7 in shape and texture, suggests that this pit contains vessels that could have broken during the use of one or both of these structures (but see above for a discussion of the stratigraphic evidence). The consistency of shape, fabric and finish among the pots from pit C1128 makes it difficult to arrive at a definitive total for the number of vessels present, and the figure of 37 must be regarded as a minimum. The pots all have flat bases with upright or slightly splaying walls to form cylindrical or bucket-shaped profiles. In at least two cases, the walls have an additional splay, possibly around the vessel's mid-height; and one pot (P241, Illus 41) from Structure 7, post hole C2647 (Illus 34 & 39), seems to be a small, almost cup-sized vessel with bowed walls. Rims are almost all gently squared off and either flat or slightly bevelled inwards. A few variously-shaped rims are more markedly inturned. Several of the bases have a low pedestal. The size of these vessels, expressed in terms of their estimated rim diameter, ranges between *c* 130mm and *c* 340mm, with most falling between 190mm and 250mm. Where the overall profile of a pot has been reconstructible, the depth roughly equals or exceeds the width, although a massive vessel (P251, Illus 41) from post hole C2301 in Structure 7 (Illus 34), may be a fairly shallow but broad (340mm wide), tub-shaped pot. Wall thickness almost invariably lies within the range 10–15mm. Surfaces tend to be uneven, despite the consistent addition of a slip, a feature common on the Meadowend Farm Bronze Age pottery, but not present on the Neolithic pottery. With the large tub-shaped pot, the interior had been smoothed probably using a bunch of grass, leaving horizontal marks. Several pots have horizontal or vertical surface undulations, relating to the shaping of the pot using fingers. In comparison with the earliest Neolithic pottery, much less care has been taken to ensure smoothness of the surface. The fabric is hard and often gritty, with fairly abundant, small inclusions, mostly of quartz dolerite; some vessels have a sandy texture. Many of the vessels have burnt-on black organic residue on their interiors, indicating their use as cooking pots, and in some cases this occurs as a clearly defined band around the upper part of the interior. Some sherds are burnt, including the lower part of a small, roughly cylindrical vessel (P250, not illus) found in deposit C2713 (Illus 35), a layer sealing the two Structure 1 hearths.

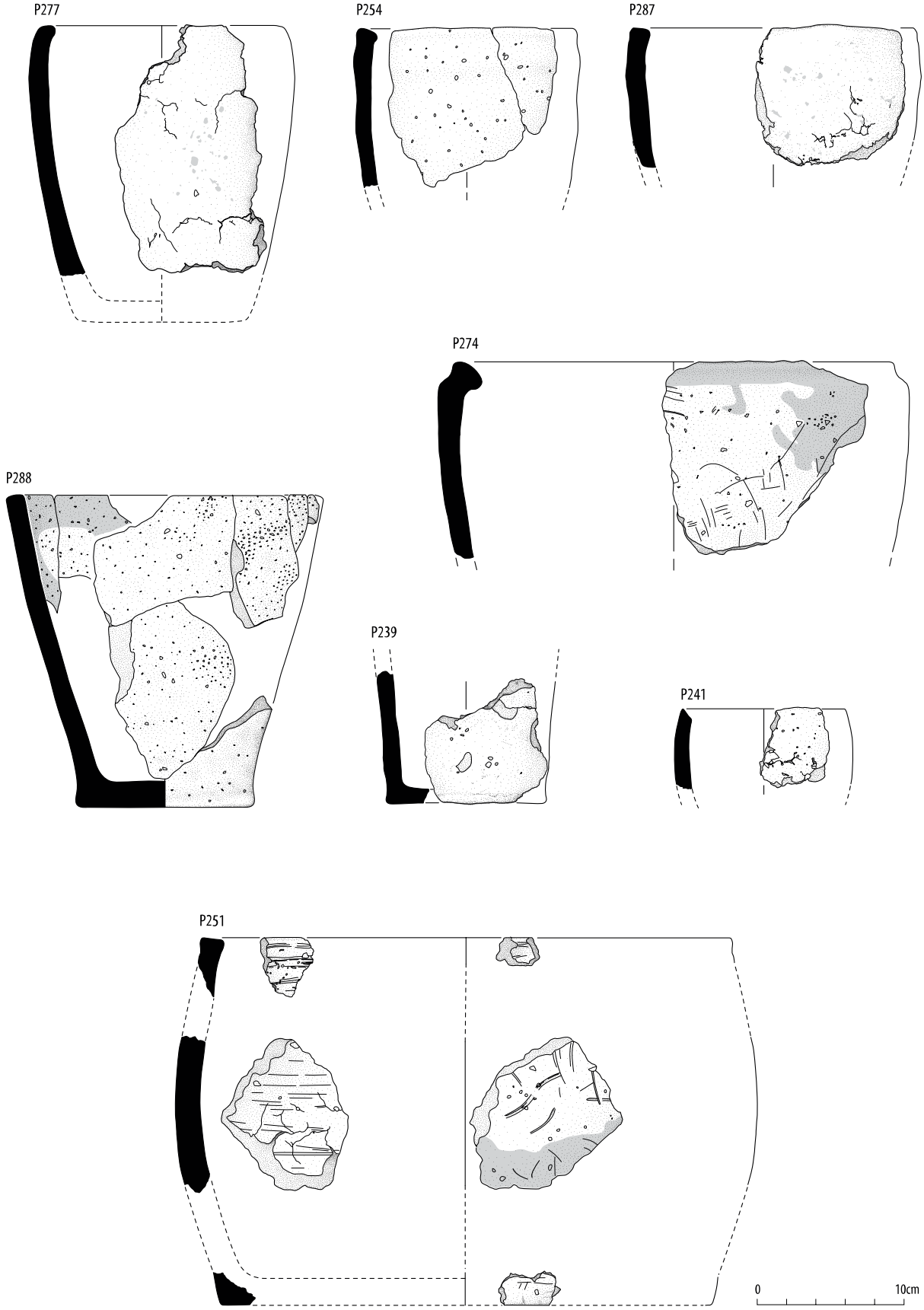
As noted above, pieces of fired clay found in hollow C2353 in Structure 1 may be the remains of daub.

5.4.3 Middle to Late Bronze Age pottery (1300–1000 cal BC)

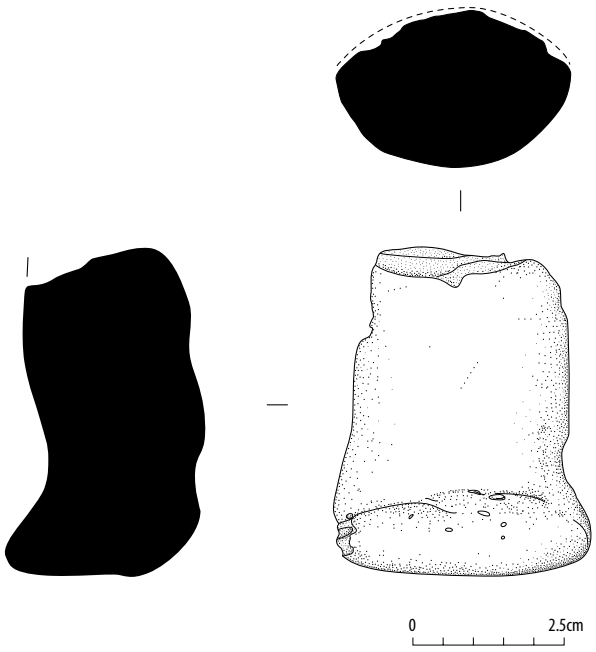
Only a small amount of pottery can be attributed to this period, just four pots. These derived from two radiocarbon-dated contexts in Structure 6 (post holes C3699 and C3684, Illus 38). In addition, a featureless sherd (P311, not illus) from Structure 4 (post hole C5635, Illus 38), which has produced similar dates, is also likely to belong to this period. The sherd from C3684 (P295, not illus) is also a featureless body sherd, *c* 10mm thick, from a cooking pot. There were three sherds in C3699, probably representing two pots (P292, P293, not illus). The most informative of these (P293) is a flattish rim from a fine-textured vessel of rim diameter *c* 190mm and wall thickness *c* 10mm. Part of the exterior of this sherd had spalled off, probably along a ring joint plane.

5.4.4 Other potentially Bronze Age ceramic

One other item deserves mention here: a fragment of a solid, originally oval to cylindrical piece of fired clay with an expanded flat end, surviving to a length of *c* 55mm and around 43mm across its widest part (Illus 42). It was found in an isolated pit (C2654, not illus) in the south-east of Field 3. This item had no other artefactual associations and its identification is problematic, as it could theoretically be one of several objects. It resembles a leg of a polypod Beaker bowl, but since no incontrovertibly Beaker pottery has been found on the site, and since no other polypod bowl has been found in Scotland (other than the footed Food Vessel from Upper Largie, Argyll and Bute, Sheridan 2008), caution needs to be exercised in identifying it as such. Alternatively, it could theoretically have been part of a handle for a pot, but no such pot form is known from prehistoric Scotland. Thirdly, similarly shaped (but usually more bobbin-like) objects are known from Bronze Age and Iron Age contexts on the Continent (eg at Verucchio, Italy), where they



Illus 41 Middle Bronze Age pottery. © Headland Archaeology



Illus 42 Fired clay object. © Headland Archaeology

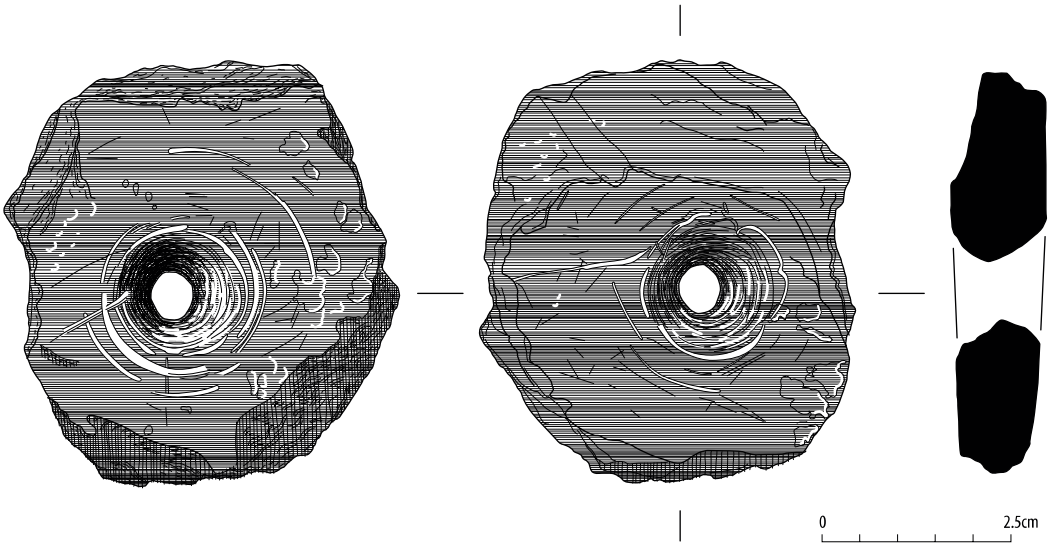
are believed to have been used as spools to weigh down threads in tablet weaving (Ræder Knudsen 2012: 259–60 and figs 11.10–11). However, the presence of such an object in a Scottish Bronze Age context would be unique. Finally, it bears a resemblance to an element of briquetage, a support for an evaporation pan as used in salt extraction, and the fact that the area to the south of the site will have been high salt marsh from the Middle Neolithic onwards might lend support to the idea of local salt extraction; but usually such artefacts are found in groups, rather than individually (Harding 2013: fig 5.1). It may have been none of those things: its identification and dating must, for the time being, remain an open question.

5.5 Bronze Age stone artefacts

Alison Sheridan

The most distinctive of the Bronze Age stone finds was a small perforated roughout for a circular object, possibly a 'napkin ring' (F34, Illus 43) of oil shale or canneloid shale. It has a biconical near-central perforation, with rotary abrasion marks indicating that this was being expanded and smoothed when it was discarded. It measures 54mm by 51mm and is 12.5mm thick. The roughout's edges were roughly bifacially flaked to an approximate circle; this flaking also removed parts of the face. The faces utilise the block's natural surfaces, unmodified bar some scattered peck-marks. Both bear incised marking-out lines. One has a well-formed circle (16mm in diameter), largely lost in making the perforation, with a few more irregular hand-carved lines beyond this; two further arcs (one carved into a flaked surface) give an intended outer diameter of *c* 28mm. The other face has much more regular lines, incised in neat circular arcs. The innermost is a complete circle *c* 16.5mm in diameter, formed of four overlapping arcs. Beyond this is two-thirds of a circle *c* 20mm in diameter, with two much more partial outer circles: one arc forming a quarter of a circle (diameter *c* 25mm), another a third of a circle (diameter *c* 35mm), with a short arc adjacent to this at *c* 38mm diameter probably intended as its continuation. The lines form regular arcs in short stretches; some show a clear, deep starting point but fade to a fine scratch further round the arc. This indicates the use of an adjustable compass, in contrast to the more typical and rather crude hand-sketching normally found on roughouts (eg Hunter 1998a: illus 19 no. 10). The multiple circles imply an intended inner diameter of *c* 20mm and an outer one of 35mm. The material is laminar in nature, with a slight conchoidal fracture, suggesting it is a canneloid shale. The reason for its discard in an unfinished state is not clear but perhaps the material was too laminar for successful working to the intended complex form.

The roughout was found in pit C3036, within Pit Group 1 (Illus 11). Though associated with a quantity of Middle Neolithic pottery, it is extremely unlikely to be of Neolithic date. Although jewellery of black organic-rich stones is known from the Neolithic, this typically comprises elongated belt sliders and various forms of bead (eg Clarke et al 1985: figs 3.35–6, 3.38, 7.2–3). Ring-jewellery such as this is much more typical of the Bronze Age and Iron Age and thus the find is more likely to be associated with the Middle Bronze Age activity in Structures 1 and 7 about 10m to the north-west. Sheridan et al (1998: 126) provide a brief survey of contemporary material. The intended product is not always clear from a roughout. In the present case, it is too small to be a bangle, and too large for a finger ring. It could have been a ring-pendant,



Illus 43 Bronze Age shale roughout. © Headland Archaeology

although this is an Iron Age type, but perhaps most plausibly it was intended as a so-called 'napkin ring', a well-known Early–Middle Bronze Age artefact type (Hunter 1998b). This would explain a number of the features. The different outer diameters marked on the two sides (28mm as opposed to 38mm) would fit the asymmetrical swelling form of a napkin ring, as would the multiple circles on the broader face, perhaps guides for the changes of angle typical of such rings. The fact that the perforation was being abraded indicates it was not far from its intended size, which is consistent with the inner diameter of napkin rings; abrasion was generally used as a finishing technique, as it is a slow way to expand a perforation compared to cutting or gouging. Contextual evidence suggests that such rings were clothes fasteners; this example lies towards the northern edge of their distribution (Hunter 1998b) and would have been a relatively thin example. Although a precise source for the material cannot be identified, suitable raw materials would have been available locally in the Coal Measures deposits of the Scottish Central Coalfield (Gibson 1922: 10–16; Cameron & Stephenson 1985: fig 26).

Another piece of canneloid shale, a flake (F35, not illus), was found in post hole C2550 (Illus 11 & 34), about 12m to the west and part of the Structure 7 post-ring. It is 21.5mm by 16.0mm by 2.5mm and of similar laminar material with a hint of conchoidal fracture. It comes from the corner of an unmodified block, perhaps from trimming, but could be a natural spall rather than working debris. It appears to have a broken perforation but this is an illusion of the fracture pattern. The find was associated with a single sherd of Neolithic pottery and thus it is possible that this too is a residual Neolithic find, though the feature itself is otherwise clearly Bronze Age.

One final stone find is worth a brief note. It was a natural water (or ice) rolled cobble, measuring 89mm by 80mm by 46mm (F33, not illus). It is rounded-triangular in plan and plano-convex in profile. The flat surface shows signs of use as a grinder or smoother; its size and shape make it ideal for such a use, as it fits in the hand. It was found in isolated pit C3549 in Field 3 (Illus 39), associated with possible Beaker pottery and is thus potentially of Early Bronze Age date.

5.6 Charred plant remains from the Bronze Age features

Scott Timpany, Sarah-Jane Haston & Laura Bailey

5.6.1 Early Bronze Age

No charred plant remains were recovered from Structure 5 but charcoal analysis was undertaken

on material from its ring-groove (C3293, Illus 31, SUERC-16895) and from two other features also in Field 3 which returned Early Bronze Age radiocarbon dates (pit C3637, Illus 38, SUERC-16857; post hole C3904, Illus 14 & 39, SUERC-16869). The ring-groove and post hole C3904 contained similar assemblages of mostly hazel, with some alder. Ring data from this sample again suggest smaller timbers, possibly branchwood being used with fragments having between 4 and 14 rings. This number of rings from some of the roundwood present may also indicate the presence of coppiced wood being utilised and hence imply some woodland management was taking place during the Early Bronze Age. Post hole C3904 also contained hazelnut shell, which may have been attached to the fuel wood.

The pit C3637 was dominated by alder and was distinctly different from the later oak-rich Structure 6 features around it. Ring count information shows alder fragments had up to 19 rings, suggesting some larger timbers may have been burned.

5.6.2 Early to Middle Bronze Age

The best palaeoenvironmental evidence was found in Structure 1 with further samples from Structure 7. No suitable material derived from Structures 2 and 8.

The Structure 1 charred plant remains (excluding charcoal) were limited to hearth C2638 (fills C2791 and C2792, Illus 34 & 35). Cereal grains are few but the majority (17 grains) are of naked barley, with a further two grains of emmer wheat. The naked barley from the lower fill produced a radiocarbon date of 1500–1300 cal BC (SUERC-16880). The continued use of naked barley into the Bronze Age is of interest, as it is during this period that a switch is often seen to cultivating the hulled variety, often signalling the end use of naked barley. The paucity of charred plant remains within the structure, like the lack of pottery, suggest that it was kept reasonably clean during its occupation (or else that plough-truncation has removed the floor surfaces upon which such material might be expected to be found).

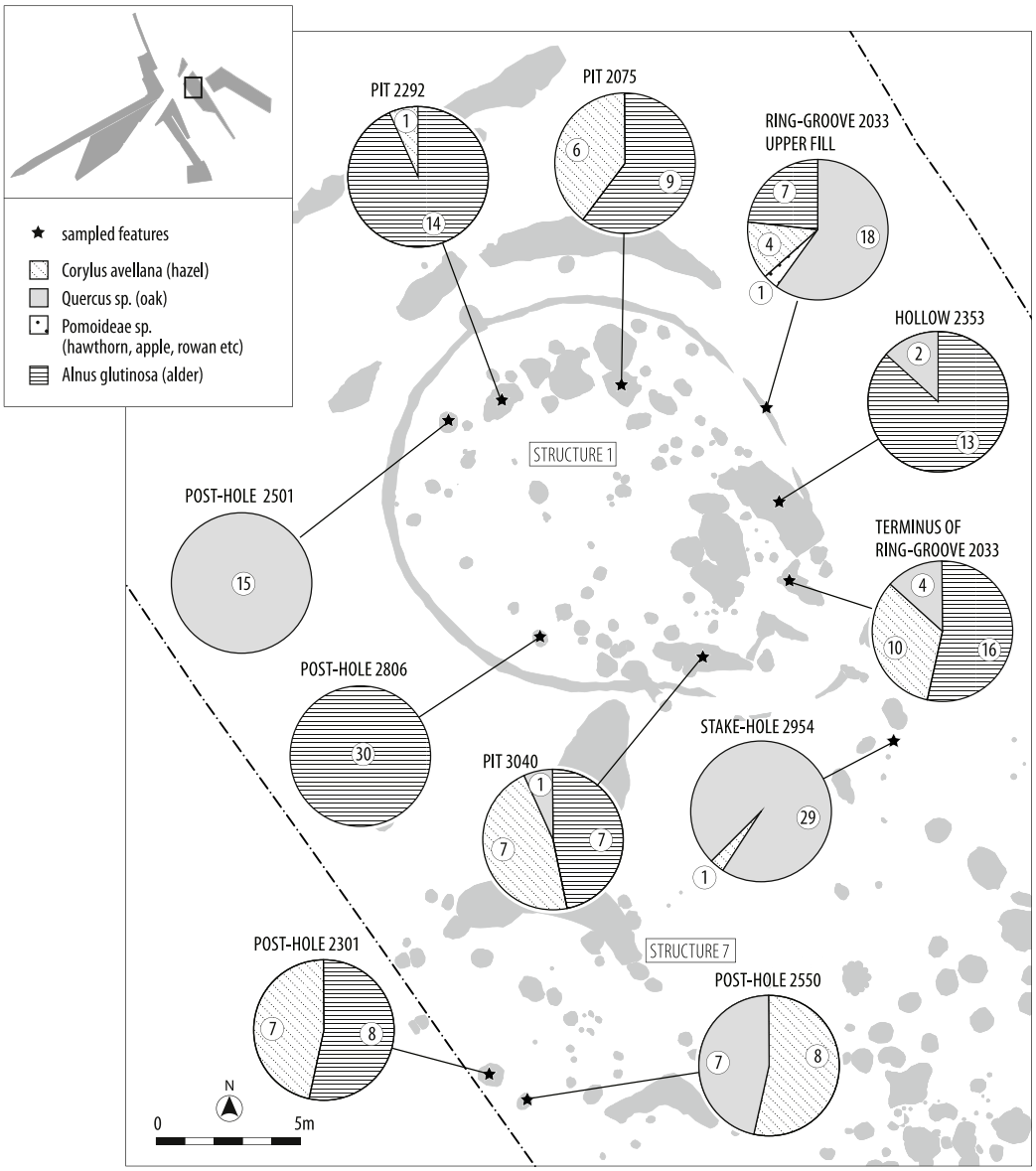
Charcoal analysis has been undertaken on material from seven features within Structure 1 (Illus 34): ring-groove C2033; pits C3040, C2075 and C2292; post holes C2501 and C2806; hollow C2353. The assemblage is dominated by alder (Illus 44) with oak and hazel also present in significant quantities, together with a small amount of Pomoideae sp. Poplar was also found in post hole C2124 during radiocarbon dating identification.

The assemblage from Structure 1 shows a large increase in the amount of alder being utilised compared to the Neolithic assemblage. This rise in the quantity of alder is likely to reflect an expanse in wetland woodland in the area and the utilisation of this resource.

The evidence for alterations, repairs and possible fire damage (see above) suggests that some of the charcoal might represent structural material, rather than just fuel. Thus the purely oak assemblage from post hole C2501 might represent a former post. Material from stake hole C2954 (Illus 34), part of a group of stake holes lying to the south of Structure 1, was also almost entirely of oak and again this might reflect the remains of the stake.

Ring count data from the charcoal analysis suggests that a range of different-sized timbers were used for fuel, with fragments having between 1 and 23 rings. The alder fragments were found to have the largest number of rings, with fragments from pit C2292 having 4 to 23 rings, indicating that larger timbers were being burnt. However, some caution is required for ring counts on trees such as alder, due to the ability of these trees to grow more than one ring per year and for growing half rings. The oak fragments from Structure 1 were seen to have 1 to 10 rings, while those from stake hole C2954 had 3 to 19 rings. The hazel had 3 to 18 rings and Pomoideae sp had 2, indicating a mixture of branchwood and small twiggy material was gathered for fuel, together with possible larger timbers.

The only charred plant remains (except charcoal) recovered from Structure 7 were naked barley. Material from three features was analysed, post hole C2301 and pits C2649 and C2682 (Illus 34). Naked barley was present in small quantities (1–10 grains) within all three samples. Grain from pit C2649 returned a Neolithic date (SUERC-16888) and thus must be residual material from activity associated with nearby Pit Group 1. That naked barley was still being cultivated into the



Illus 44 Charcoal from Structures 1 and 7. © Headland Archaeology

Bronze Age is confirmed by another Bronze Age date, of 1490–1285 cal BC (SUERC-16844), from post hole C2301. The small number of grains provides relatively little information in itself and, as with Structure 1, is likely to reflect the remains of food waste which has been swept into the post hole.

Charcoal analysis on material from post holes C2301 and C2550 showed only hazel, oak and alder present (Illus 44). Unlike the Structure 1 assemblage, that for Structure 7 is dominated by hazel, although alder is present in significant quantities, as too is oak. The high occurrence of hazel might reflect the proximity to Neolithic Pit Group 1, where hazel was more common. The presence of a Neolithic sherd in post hole C2550 clearly shows the residuality of Neolithic material in this area. The tree types present again suggest it is a mixture of wetland and dryland woodland being exploited during this period. Ring counts from the charcoal fragments indicate that small timbers (eg branchwood) were being used for fuel, with fragments having 2 to 10 rings. The oak fragments were found to contain the largest number of rings, 5 to 10, while alder and hazel had 2 to 7.

5.6.3 Middle to Late Bronze Age

The only charred plant remains associated with Structure 3 were charcoal. Four samples were analysed (post holes C3356, C3459, C3450 and C3469, Illus 38) and show oak to be the main taxon utilised at the site. Alder and hazel continue to be present in significant quantities and represent the other main arboreal species used. Smaller amounts of elm and willow were also identified. The charcoal is likely to represent fuel debris rather than structural material, with observations during excavation indicating that the timbers for the building were more likely to have been removed following occupation rather than burnt in situ. Ring counts from the fragments show that they had between 3 and 12 rings, suggesting they are more likely to represent branchwood or cut timbers.

Only one sample was analysed from Structure 11, pit C3295 (Illus 38) just outside the post-ring. It contained an assemblage similar to that of Structure 3, dominated by oak with alder and hazel also present and a small quantity of bird cherry. Ring counts are also consistent with Structure 3 and are generally suggestive of small or cut timbers with 1 to 12 rings. One fragment of alder had 22 rings, indicating that some larger pieces may have been used. Again, the finds are most likely to represent discarded fuel waste.

Both charcoal and other charred plant remains were recovered from Structure 4. The non-charcoal remains were limited to post hole C5686 (Illus 38) and amounted to a small amount of naked barley and hazelnut shell fragments. Another Bronze Age date was returned for the naked barley (1110–910 cal BC, SUERC-16865), further expanding the date range for the cultivation for naked barley at the site into the Late Bronze Age. As with previous structures, the assemblage is likely to represent accumulated food debris, possibly resulting from hearth rake-out material being inadvertently swept into post holes during cleaning of these features.

Charcoal analysis was undertaken on material from eight Structure 4 features, post holes C5702, C5684, C5686, C5675, C5651, C5653, C5647 and C5690 (Illus 38). Again, oak is the dominant taxon, with alder and hazel still present in significant amounts. A single fragment of blackthorn was found in post hole C5647. The ring count information suggests that some substantial timbers were present with oak fragments having 1–30 rings. The non-oak fragments are suggested to represent smaller timbers with ring-counts of 2–14 rings. Some of the charcoal fragments could represent structural material as well as fuel waste.

Charred plant remains were found in two closely spaced features within the outer line of Structure 6, pits C3634 and C3648 (Illus 38). Both contained a significant quantity of naked barley grain and hazelnut shell. Barley was most common in pit C3648, with 65 grains, while hazelnut shell was most common in C3634, with 415 fragments. It is possible that these features were used as nut roasting pits, a practice noted during the Neolithic in Pit Group 1 (see above), though disposal of food waste is also a possibility. Charcoal analysis was undertaken on the material from post hole C3709 (about 11m south of Structure 6, not illus) with similar results to the other structures in this group, oak being the most prominent taxon, with smaller quantities of alder and hazel. The ring counts for this sample again are suggestive of small or cut timbers, with fragments having 2 to 8 rings.

Oak is clearly the main fuel source used during this phase, a distinct change from the alder that was predominant during the Middle Bronze Age occupation of Structures 1 and 7. The arboreal taxa represented indicate that it is largely dryland woodland, which is now being utilised as a resource for timbers, with oak, hazel, elm and blackthorn all present. Wetland woodland continues to be utilised to a lesser extent, as indicated by alder and willow. This may also reflect a reduction in wetland woodland in the area.

5.7 Discussion of the Bronze Age features and finds

5.7.1 Structural evidence

Julie Franklin & Elizabeth Jones

The Bronze Age roundhouses attest to repeated re-occupation of this area after what appears to be a long interval. Interpretation of the evidence is, however, hindered by the spatial limitations of the excavation – there may well be further structures outside the excavated area, and in many cases features were close to the excavation edge – and by the fact that, being found on agricultural land, they have

all suffered plough-truncation, to varying degrees (Halliday 2007: 52). The later roundhouses in Field 3 are particularly affected, the post holes of Structure 3 being only 10cm deep, and the incomplete plans, clean interiors and lack of artefactual evidence clearly show that much has been lost. The focus of the Bronze Age occupation activity appears to have shifted backwards and forwards from Field 3 to Field 2, then Fields 2 and 3 together, then just Field 2, then finally back to Field 3 again. But this is a very incomplete picture. Phases of apparent abandonment might in fact merely mean a move to another nearby structure, as yet undiscovered or since destroyed by later activity. The area being relatively low-lying and close to the river, it was clearly an attractive area for settlement and farming, as evidenced by its repeated use over a long period. It is possible, then, that the settlement focus merely drifted at times outwith the excavation area.

Interpretation is, however, aided by the fact that all the roundhouses recently formed part of a synthetic study of Bronze Age architectural traditions in Scotland (Pope 2014; note that the same structure numbers were used there, prefixed 'UFC H'). Among the interesting findings to emerge from this study is that Early Bronze Age Structure 5 is currently the earliest known ring-grooved structure in Scotland.

While the radiocarbon dates span the Early Bronze Age to the Late Bronze Age, it is unlikely that we are dealing with continuous settlement on site, bearing in mind the use-life of any individual structure. Estimates based on post diameters of up to 0.25m suggest a maximum lifespan of 30–75 years for a Bronze Age roundhouse, without substantial repair or rebuilding (Brück 1999: 152). However, the evidence of dendrochronological estimates from waterlogged sites suggests that they were occupied for as little as 5−15 years (Barber & Crone 2001); this figure accords with experimental work that suggests that repair would have been necessary after 8−14 years (Reynolds 1993: 110). In view of this, and even taking into account the evidence for some rebuilding, overall the roundhouses produce an impression of discontinuous occupation at different times during the 2nd and early 1st millennia.

The earliest Bronze Age structure is Structure 5 in Field 3, with its central post hole and ring-groove (Pope 2014: 173), about 8m in diameter. It is unclear whether this had been a dwelling or an ancillary structure, relating to a settlement outside the excavated area. Ring-grooves are thought to have been bedding trenches for pre-fabricated wattle wall panels and, if digging with a wooden shovel, would have been easier to create than a set of post holes, which would have to be excavated individually (ibid). Pope has argued that the central post hole could either be evidence for a structural support used only during construction, or it could have housed the central post for a tent-like structure (Pope 2014: 171). At 8m in diameter, however, this is arguably very large for a tent. Deposition of pottery in pits and the presence of hearth-pits suggest associated activity in the broad area about 60–80m to the south and south-west of Structure 5.

The next structure, Structure 2 in Field 2, appears to post-date Structure 5 by several centuries but it bears many similarities to Structure 5, including the presence of a ring-groove, though it is larger, at 12.5m. The centre of this structure lay outwith the excavation area, so it is not known whether it, too, had a central post. Activity seemingly contemporary with Structure 2 was found some distance from it about 75m to the north-west, in the form of a series of large pits located within the area of Structure 1 (and quite possibly pre-dating the construction of that house). Indeed, the location of these pits may have had some significance for the later occupants, and perhaps the subsequent move from Structure 2 to Structure 1 reflects a generational shift in the settlement (Brück 1999). The dates for Structures 2 and 1 overlap at the 68.2% probability range and it is possible that the one followed directly from the other.

It is possible that some of the features to the south of Structure 7 represent an entrance to a roundhouse pre-dating Structures 1 and 7, which has since all but vanished. An upstanding Iron Age roundhouse at Drumcarrow, Fife, contained only one negative feature, a post hole by the entrance, where it was thought to have supported a door frame (Maxwell 1967: 103).

Structures 1 and 7 appear to have been built around the late 16th century cal BC. The dates for the earliest phase of the use of Structure 1 have calibrated ranges of 1630–1455 cal BC (SUERC-16887) and 1610–1420 cal BC (SUERC-16847) respectively, but the actual duration of this phase

of occupation will have been a short part of those overall ranges.

There is ample evidence for necessary repair, particularly in Structure 1, perhaps to strengthen areas of the roundhouse that were subject to more stress. Experimentation has also shown that it was possible to replace any of the upright timbers without disturbing the structure (Reynolds 1993: 102), suggesting that the repairs may have been ongoing throughout the life of the structure. Other examples of repair, such as re-thatching or re-plastering of walls, would not have left an archaeological trace (Brück 1999). This does not necessarily mean a particularly long-lived house. Repairs and alterations to roundhouses could accrue quite quickly over the space of a few years (Barber & Crone 2001: 71).

The pairing of Structures 1 and 7 is common on roundhouse sites and these two structures may have housed a small extended family (Ellison 1981; Brück 1999; Guttmann & Last 2000: 349; Brossler et al 2004; Ginn 2011), or a dwelling paired with a barn for storage or housing livestock (Halliday 2000: 61). Structure 1 is the largest of all the roundhouses on site, with its ring-groove measuring at least 13m across, and with an inner post-ring. While Structure 7 may appear to be a much smaller, ancillary structure, if it had been of similar construction to Structure 1, with an outer wall that was archaeologically invisible, it would have been nearly as large. The ring-ditch in Structure 7 is a feature often associated with livestock, caused by repeated mucking out. The housing of livestock in a structure did not necessarily preclude its use as a human dwelling as well. The animals might be brought in only overnight, or during winter months, and internal space could be sub-divided. They would provide warmth and, probably, milk for the human inhabitants (cf Pope 2014: 174–6).

It is likely that there was a period of abandonment, followed by a rebuilding on the same plan, around the early 14th century cal BC. Structure 1 was remodelled, hearths were added, and Structure 7 was rebuilt to a slightly smaller scale. The period of abandonment was clearly not long enough to remove all traces of the structure. Structure 1 may have had structural elements that still remained in sufficiently good condition to be incorporated into the rebuilt structure, as no replacement post holes were found on the south-west side. The location of the hearths near to the entrance, with associated screens and working areas, might suggest some sort of industrial or pyrotechnic processes being undertaken there, though there is no evidence for this in the form of waste debris.

As noted above, the presence of pottery similar to that found in Structures 1 and 7 in the large pit, C1128, between these structures, raises the question as to whether the pottery had derived from one or both of them, or perhaps from another nearby structure in the unexcavated area. The stratigraphic evidence, such as it is, suggests that the pit post-dates Structures 1 and 7, so perhaps the pottery did come from a further structure.

The concentration of pottery in the upper fill of the pit suggests that the pit had not been dug for the purposes of waste disposal; it could have been dug to extract sediment for building a house and then been backfilled using waste material. The area between the two houses may then have been used to dump general domestic waste, with the midden-rich deposits only surviving where they have slumped into this pit over time, the rest being removed by subsequent land use. Whatever the precise taphonomy, the net effect is broadly similar, the pit preserving an impressive collection of Bronze Age domestic pottery.

Both Structures 1 and 7 appear to have been abandoned around the same time, probably by the early 13th century cal BC.

After this the next phase of documented activity moves back to Field 3, where the complex of Structures 3, 4, 6 and various smaller ancillary structures appears to date to the late 12th and early 11th centuries. The three main structures all consist of post-rings, possibly all double post-rings, though all are so truncated that little detail remains to shed light on internal divisions, hearths or activities. Structure 3 is notable due to its very long and north-west facing porch entrance which opens directly onto the presumably contemporary Structure 11, as well as its more normal south-eastern entrance (Pope 2014). Presumably the connection to Structure 11 was sufficiently important to override this convention. Similar occurrences were noted at the Bronze Age village at Corrstown, County Londonderry, where some of the doorways had been shifted to accommodate neighbouring houses (Ginn 2011). The phenomenon of two opposing

entrances was also noted at two Iron Age sites, Rispain (Haggarty & Haggarty 1983: 34, fig 10) and Hayknowes Farm (Gregory 2001: 36), both in Dumfries & Galloway. In both cases the entrances were also slightly offset.

The pattern at Meadowend Farm would support the notion of small family units moving across the landscape over generations, and several comparanda can be cited for this practice (Rideout 1995: 186; Pitlethie Road: Cook 2007; Kintore: Cook & Dunbar 2008). These comparanda include the landscape at Lairg in northern Scotland, where areas went into and out of cultivation over several centuries (McCullagh & Tipping 1998: 205–12). Discontinuous settlement has been widely noted in Bronze Age archaeology, while wider landscape and palaeoenvironmental studies indicate continuous land use, probably involving a rotation of farmland, from cultivated ground to pasture and back again, to prevent the land from becoming exhausted (Halliday 2000: 61; 2007: 53–4). The roundhouses would have followed the farming and were placed where necessary to take care of the tasks in hand at the time (Halliday 2007: 54).

The larger roundhouses display a number of characteristics typical of Middle Bronze Age roundhouses, such as axial symmetry, elaborate entrances, double-ring construction and generally south-east orientation (Brück 1999: 155). These houses would have had inner load-bearing posts with an outer, non-load-bearing wall upon which the rafters sat. A ring-beam around the tops of the inner posts would redistribute the weight of the downward thrust of the roof and make the construction of an upper floor easier (Cook & Dunbar 2008: 326–7). This might suggest that the larger roundhouses at Meadowend had upper floors for sleeping or storage.

The diversity in the form of the roundhouses may be more superficial than it appears, and may derive from the use, rather than the construction of the building, as has been noted elsewhere (Ghey et al 2007: 3.3/3; Cook & Dunbar 2008; Ginn 2011: 184–6). The variation in form may reflect the local availability of wood, as construction and maintenance would have required a considerable amount of material (Pope 2008: 16). There is evidence suggesting that woodland management had been practised around Meadowend Farm since the Neolithic (see 4.7, 'Charred plant remains from the Middle Neolithic features' above; see also Coles et al 1978 on woodland management strategies). Oak was the main timber, followed by hazel, which was probably coppiced, with an average prehistoric oak post of 0.3m diameter grown in 12 years (Pope 2003: 171, 383). A large roundhouse uses wood from at least 37 large timbers and the rest from smaller stakes for the roof and walling (Reynolds 1993); this would have required less timber than a plank-built house. Although turf walls could have been used between the outer walls in post-built structures, coppiced wood would still have been important for roofing and fencing.

The fragments of daub recovered from Structure 1 suggest the use of this material on internal screens in this structure, while it may have been used on wattle walls elsewhere. Wattle walls have been suggested at a number of Scottish sites and they may have used a mixture of cow dung and soil (Reynolds 1979: 35) instead of clay. There is a suggestion of a turf wall at Structure 7, as hypothesised for some of the structures at Kintore (Ghey et al 2007: 3.3/4; Cook & Dunbar 2008).

5.7.2 The Bronze Age pottery and other ceramic material

Alison Sheridan

The ceramic evidence for human activity around the end of the 3rd and the beginning of the 2nd millennium is relatively slight, with no pottery being found in association with Structure 5. The possible Beaker sherds from the undated pits C3364, C3366, C3549 and C3745, around 80m to the south-west of Structure 5, do not bear close comparison with Beaker domestic assemblages found elsewhere in Scotland (Gibson 1982) and their identification as Beaker pottery must remain provisional. Indeed, little can be said in general about the pre-1600 cal BC Bronze Age ceramic presence, other than to make the point that the pots found in pit C5722 (Illus 32 & 39; P236 and P237, Illus 40) do not resemble the pottery found in Structure 2 (or indeed any of the Bronze Age structures), and as such they may attest to a further episode of activity at Meadowend Farm that is not represented by any buildings. The reason for attributing the pots in question (P236–P237) to the second quarter of the 2nd millennium

– possibly pre-1600 cal BC, possibly around 1600 cal BC, possibly slightly later – is that the form of P236, and the simple decoration restricted to its upper body, bear generalised similarities to some cinerary urns belonging to the second quarter of the 2nd millennium and to some Early Bronze Age domestic pottery from southern Scotland and northern England. The former include Urn 3 from Eweford, East Lothian, with its gently curving profile and simple design of twisted cord impressions on its upper part (Lelong & MacGregor 2007: fig 5.11 and see Sheridan 2007b for a discussion of its date), and similar urns from Standingstones, East Lothian and Ardeer, North Ayrshire, whose cremated bone contents have been dated to 1680–1490 cal BC (3330±35 BP, SUERC-11893) and 1740–1520 cal BC (3350±35 BP, GrA-34770) respectively (Sheridan & Bradley 2007; Sheridan 2009). The domestic pottery comparanda include assemblages from unenclosed platform settlement sites such as Green Knowe, Scottish Borders, and Standropp Rigg, Northumberland, for which Colin Burgess has proposed a date range of *c* 1650–1400 cal BC (Burgess 1995); similar pottery (albeit with a straighter profile) has been found in a lowland context dated to *c* 1700–1500 cal BC at Howmuir Farm, East Lothian (Lelong & MacGregor 2007: 121). Had the Meadowend Farm pot been contemporary with the Middle Bronze Age assemblage from Structures 1 and 7 and pit C1128, one might have expected there to be some decorated pottery among this material, and for some of that pottery to match this pot in shape. The fact that this is not the case suggests that the contents of pit C5722 may pre-date this Middle Bronze Age material (albeit not necessarily by a long time).

The Middle Bronze Age pottery from Meadowend Farm, and, as far as can be discerned, the Middle/Late Bronze Age pottery, belongs to a long-lived and widespread tradition known as 'flat-rimmed ware' (whose funerary equivalent is the bucket urn; for recent discussions of the tradition, see Sheridan 2003; Bradley & Sheridan 2005; Sheridan 2007b). The Meadowend Farm assemblage belongs near its beginning, and the associated radiocarbon dates join a growing number of good-quality radiocarbon dates for Scottish finds, many obtained through the National Museums Scotland radiocarbon dating programmes (reported annually in *Discovery and Excavation in Scotland*). As discussed elsewhere (Sheridan 2003: 208), the plainness and simplicity of form of this pottery may mask a diversity of traditions over space and time, although at a general level the widespread choice to make simple, undecorated, flat-based pots suggests that Middle Bronze Age communities were as interconnected as their Middle Neolithic ancestors. Other domestic assemblages of 'flat-rimmed' pottery contemporary with the Middle and Middle/Late Bronze Age pottery from Meadowend Farm include those from roundhouses at Kintore, Aberdeenshire (Cook & Dunbar 2008), Lairg, Highland (McCullagh & Tipping 1998) and Barflat, Rhynie, Aberdeenshire (Sheridan 2015), and these show some variability in vessel shape and design within the overall tradition at this stage.

5.7.3 The Bronze Age environmental evidence

Scott Timpany, Sarah-Jane Haston & Laura Bailey

Regarding the evidence for woodland exploitation, during the Early to Middle Bronze Age an increase can be observed at Meadowend Farm in the use of alder, particularly in the Structure 1 assemblage. Oak and hazel remain prominent within the charcoal assemblages dating to this period, indicating the continuation of oak–hazel woodland in the landscape. Pomoideae charcoal fragments were also present within the assemblage and are also likely to represent trees such as hawthorn growing within the oak–hazel woodland. The increase in the utilisation of alder indicates an expansion of wetland woodland in the area, possibly along the shore of the River Forth. Such a rise in the use of alder has been noted from charcoal assemblages at other Bronze Age sites in Scotland, such as at Midmill, Kintore (Timpany & Masson 2009). It has been noted (eg Birks 1991) that a shift to a wetter climate took place near the start of the Bronze Age; recent studies (Langdon et al 2003) have dated this climate change to *c* 3850 cal bp (around 1900 cal BC). This shift to wetter conditions may account for the rise in alder seen in the charcoal records for the site. The waterlogging of sediments and rises in groundwater tables would have been beneficial for trees such as alder (and willow) at the expense of other less tolerant species such as pine and elm (cf Charman 1995). An increase in alder during the Bronze Age is also seen in other

parts of central Scotland such as Linwood Moss, Renfrewshire, where Boyd (1986) observes a rise in alder pollen dating to 3630±50 BP (SRR-2031; 2140–1880 cal BC). However, at other sites across central Scotland, particularly those close to water bodies, such as Black Loch (Whittington, Edwards & Cundhill 1991), alder was already established in the landscape prior to the Bronze Age.

A further shift is seen in the charcoal record from Meadowend Farm during the Middle Bronze Age, where oak becomes the dominant taxon. Hazel is also present in significant quantities across features dating to this period and this suggests that the oak–hazel woodland is still prominent in the landscape. This continued presence of oak–hazel woodland is also shown in pollen diagrams across the area (eg Whittington, Edwards & Caseldine 1991; Whittington, Edwards & Cundhill 1991), with Ramsay and Dickson (1997) noting that large clearances of woodland across central Scotland began in the Iron Age. Other arboreal taxa likely to have been growing within this woodland are also shown in the charcoal record and include blackthorn, elm and bird cherry. The continued presence of wetland woodland in the area is also shown by the presence of alder and willow in the charcoal record.

As regards the nature of agricultural activity at Meadowend Farm, the charred plant assemblage shows that naked barley remained the favoured cereal crop (with emmer wheat only occurring as a few grains in the Early to Middle Bronze Age Structure 1), and radiocarbon dates from naked barley grains show that its cultivation continued into the 10th century cal BC (SUERC-16865). It is during the Middle Bronze Age that a shift is generally seen in the use of barley, with the hulled variety (*Hordeum vulgare*) coming to replace the use of the naked form (*Hordeum vulgare* var *nudum*) (Boyd 1988). This change does not appear to have occurred at Meadowend Farm, however. Naked barley has been recorded at other Bronze Age sites in Scotland such as Bellfield, North Kessock (Timpany 2009) but in general many assemblages of this date are usually dominated by the hulled variety (eg Timpany 2007). Meadowend Farm is therefore unusual in the absence of hulled barley in its archaeobotanical record.

With the exception of Structure 1, the charred cereal grain assemblages from the Bronze Age features generally contain small quantities of grain, which appear to represent scattered grain within the structures. The limited number of grains from these contexts (often fewer than ten) suggests small-scale loss of grain from domestic activities such as food preparation and drying of grain prior to storage. Such scattering of grain across contexts within these structures has also been observed at other roundhouse sites, such as Bellfield, North Kessock (Timpany 2009), Birnie, Moray (Timpany 2007) and Dalkeith, Midlothian (Cook 2000). This dearth of abundant grain samples within such structures may attest to the level of cleanliness maintained by the inhabitants of these buildings during their lifetime – or else to the post-depositional truncation of the deposits, removing any floors that may originally have existed.

A number of pollen diagrams from central Scotland suggest that mixed agricultural and pastoral activity was being practised across this region during the Bronze Age (Whittington, Edwards & Caseldine 1991). However, much of the dated activity occurs slightly later than that evidenced at Meadowend Farm. At Black Loch pollen evidence shows an increase in woodland clearance around 1950 cal BC, with evidence that cereal cultivation was also taking place at this time (Whittington, Edwards & Cundhill 1991). Cereal-type pollen is also present during the Bronze Age sequence at Pickletillem, north-east Fife, together with a number of ruderals (plants that colonise disturbed land). Potential woodland clearance and pastoral activity have also been noted at Linwood Moss, and dated to the Middle Bronze Age (3070±60 BP, SRR-2030; 1490–1130 cal BC) (Boyd 1986).

Together with the charred cereals recovered, evidence for the collection and utilisation of wild foodstuffs is also present within the Meadowend Farm assemblage; in particular the use of hazelnuts. Samples containing abundant hazelnut shell fragments are present within both the Neolithic and Bronze Age assemblages. The presence of hazel trees within the landscape throughout these periods is attested by the charcoal record from the site, indicating that hazel was not just used as a food source but also as a source of fuel and possibly as a construction material (eg for wattle). Three pits contained abundant quantities of nut shell, one from Middle Neolithic Pit Group 1 and two from

the Late Bronze Age Structure 6; these pits may have been used as nut roasting pits during their lifetime. Charred hazelnuts are ubiquitous across prehistoric sites in Britain and are likely to have been used as a storable source of protein and fats in the farmers' diet (McComb & Simpson 1999).

6. CONCLUSIONS

Julie Franklin, Alison Sheridan & Elizabeth Jones

The excavations at Meadowend Farm have demonstrated the repeated use of the area for domestic activities by farmers at several times between the first quarter of the 4th millennium cal BC and the beginning of the 1st millennium cal BC, highlighting aspects of continuity and change, and fitting in with the broader patterns of activity in this part of Scotland during the Neolithic and Bronze Age. The location of Meadowend Farm, on south-facing, easily cultivated soil close to the River Forth, will have made it an attractive location for mixed agro-pastoral farming, and a constant factor throughout the millennia is the presence of barley grains, suggesting cultivation of this crop in the vicinity. While the acidic nature of the soil will have destroyed unburnt bone, and while plough-truncation has made it hard to discern details of any Neolithic houses that may well have been present (and to discern activity areas within the Bronze Age roundhouses), it has nevertheless been possible to gain some insights into the lives of the inhabitants, and into the changing environment around Meadowend Farm.

In terms of subsistence strategy, the Neolithic evidence demonstrates that the inhabitants were indeed engaged in a mixed agro-pastoral farming, cultivating naked barley and emmer wheat and keeping ruminants (probably cattle) for their dairy produce as well as (probably) for their meat. The diet will have been supplemented by hazelnuts; roasting these may have prolonged their storage life. The cereal-growing and use of hazelnuts clearly continued into the Bronze Age (with emmer cultivation last attested in the Early to Middle Bronze Age Structure 1), and while no unburnt animal bones have survived, it would be possible to explore whether animals had been kept through further lipid analysis, focusing on the Bronze Age ceramic assemblage. As for methods of food preparation, there is evidence from both Neolithic and Bronze Age contexts for boiling food in pots and for roasting food in pits.

The palaeoenvironmental evidence suggests that the settlement was located within easy reach of a forest – perhaps in a clearing – and it appears that the nature of the forest changed over time, first with an increase in alder as the area closest to the river became increasingly wet, from the early 2nd millennium, and then with the emergence of oak as the dominant species, in an oak and hazel forest, by the Middle Bronze Age.

Regarding the use of natural resources, the possibility that the inhabitants may, at some point, have been exploiting the salt marshes not just for grazing but also for extracting salt may be indicated by the intriguing ceramic object described above.

It is impossible to tell whether the more archaeologically visible Bronze Age roundhouses had been occupied by a larger community than that represented by the Neolithic features. What is clear is that domestic architecture changed over time (in line with broader trends in mainland Scotland), with the Middle Neolithic features and finds suggesting that Middle Neolithic houses – if present – had probably been constructed without the need for many post holes or bedding trenches. Regarding the Bronze Age structures, the discovery that Structure 5 is the earliest ring-groove roundhouse known in Scotland is noteworthy, while the proliferation of house structures during the second half of the 2nd millennium is part of a broader trend over much of Scotland (and indeed beyond). The fact that people returned to an area that had been inhabited long before is a phenomenon that can be paralleled in many other areas, for example at Kintore, Aberdeenshire, where the Middle Bronze Age roundhouses were located within 10m of clusters of Neolithic activity (Cook & Dunbar 2008: 348). While it is most unlikely that any trace of the Neolithic settlement would have remained visible for a millennium, the fact that the topographic setting lends itself to farming arguably suffices to explain the co-location of Neolithic and Bronze Age activities.

The communities who inhabited the area were probably self-sufficient, producing their own food, making their pottery using crushed rock

obtained from up to 10km away, and (during the Neolithic) gathering a cobble from the Forth to use as a tool and procuring a roughout for an axe- or adze-head from around 20km away in the Ochil Hills. But there is also evidence, from the Neolithic contexts, that they interacted with other groups, thereby maintaining all-important social links. It is through such networks that the pitchstone from Arran, the Neolithic non-local flint blade and the Middle Neolithic axehead from Creag na Caillich will have made their way to the site.

The most important contribution made by the Meadowend Farm excavations is in clarifying the ceramic repertoire and the dating of Scottish Impressed Ware as a tradition. As with the imported stone objects, the pottery attests to links with other communities insofar as many of its forms and decorative techniques and designs are shared among potters in southern Scotland and northern England. Having a well-dated assemblage assists greatly in assessing the currency of specific vessel forms and designs, and enhances the otherwise woefully small corpus of dates for Scottish Impressed Ware (MacSween 2007; Sheridan 2016).

Various questions remain unanswered about the human occupation at Meadowend Farm: why was there a millennium-long gap in occupation after the Middle Neolithic? Is it that the community simply relocated elsewhere, either to unexcavated parts of the site – a distinct possibility – or further along the Forth valley, to pastures new? And why did occupation apparently cease during the early 1st millennium cal BC? In her study of domestic structures in northern Britain, Rachel Pope has argued (Pope 2003: 397) that there may have been a more general decline in population around this time, with less house-building occurring than during the Middle Bronze Age, and Ian Armit has suggested that this was perhaps connected with climatic deterioration and soil exhaustion (Cowie & Shepherd 1997: 166–7). Less favourable weather may have been a reason for the narrow doors and long porches seen in Late Bronze Age roundhouses (Pope 2003: 387, 394). The collapse of the extensive Atlantic Bronze Age network of elite contacts around 800 BC will certainly have had consequences for the power structure of Late Bronze Age society, but how this impacted on settlement patterns in Scotland remains to be clarified (cf Armit & Ralston 1997: 191–2). These, and other questions about early 1st millennium changes, all form part of the Scottish Archaeological Research Framework (ScARF 2012c) and it is hoped that future research guided by ScARF will help to reveal the answers.

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