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ARO47: Balbithan Wood, Kintore, Aberdeenshire: the evaluation of prehistoric landscapes

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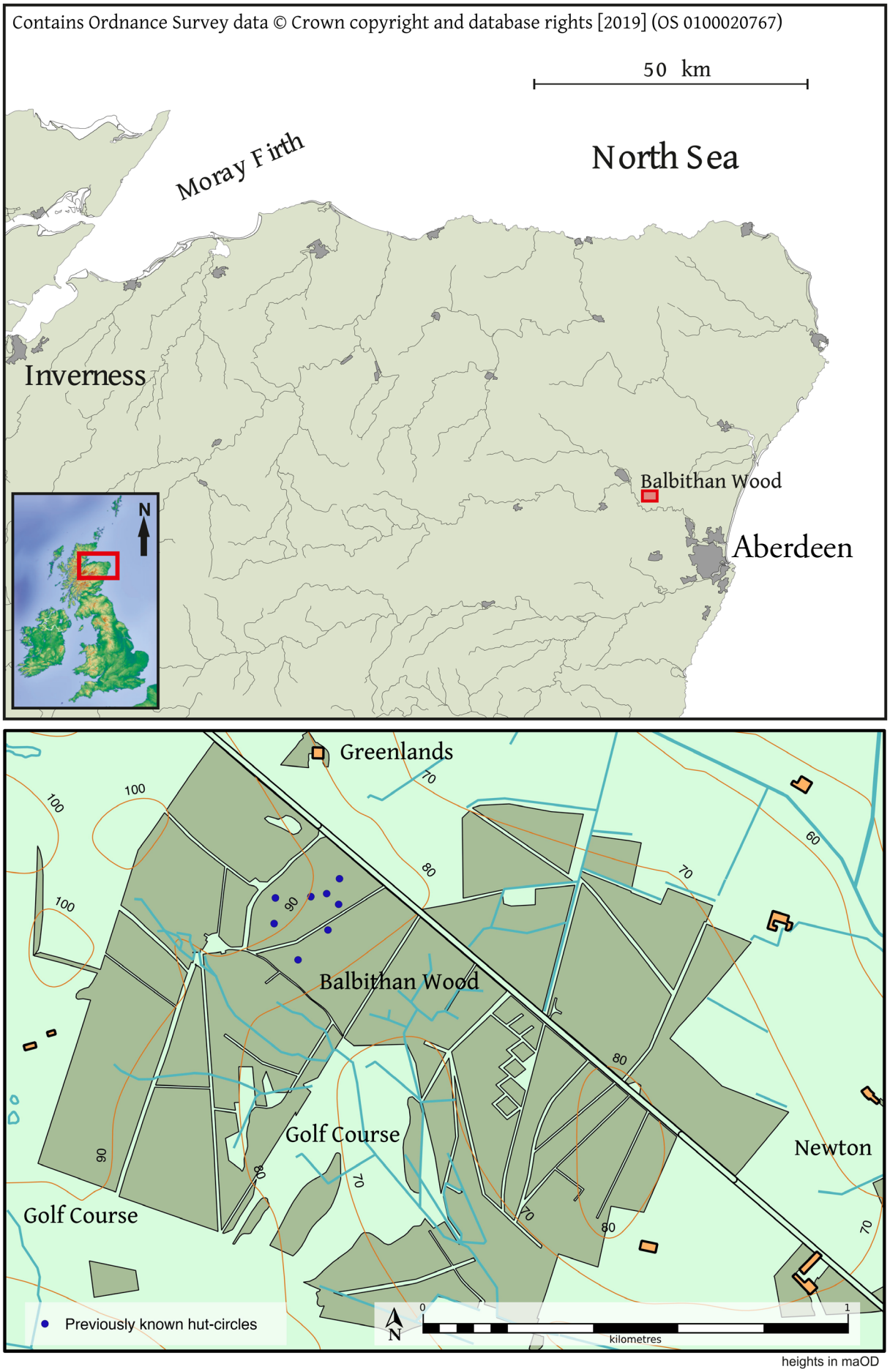


Figure 1: Site location and study area, including the original plot of hut-circles by the Ordnance Survey.

Summary

This publication presents an initial assessment of a multi-period prehistoric landscape at Balbithan Wood, Kintore Aberdeenshire conducted by over 100 volunteers over a six year period via small scale archaeological interventions. The evidence and its interpretation is presented as a discussion describing the transition from field survey of hut circles and cairns to more nuanced descriptions of hut circles, rings cairns, clearance cairns and non-clearance cairns. The project also identifies the changing landscape use from the Mesolithic to the middle Bronze Age. These are compared to earlier excavations by the author and others in the immediate environs. This has identified key differences in economy, land use and response to climate change. All of which is used as basis to propose further research.

Abstract

Commercial mitigation interventions at Kintore, Aberdeenshire revealed an extensive series of plough- truncated roundhouses, representing one of the biggest assemblages in Scotland (Alexander 2000, Cook and Dunbar 2008, Cook *et al.* forthcoming). In order to provide upstanding comparators to this assemblage, and therefore maximise the available information, the author delivered an extensive programme of survey and evaluation in Balbithan Wood, Kintore, between 2005 and 2016, comprising six two-week seasons. This programme surveyed 27 surviving hut circles and 217 cairns. Over the same period, seven cairns and eight hut circles were sampled, with the resulting radiocarbon dates indicating activity in the Neolithic, middle Bronze Age (MBA), later Bronze Age (LBA) and later Iron Age (LIA), although the majority of dates were from the MBA.

The evaluation also recovered an array of struck lithics, the majority of which appeared to be residual material but revealed Mesolithic and Neolithic activity. In addition, the evaluation revealed far more complexity than was expected and that the hut circle assemblage included a variety of non-domestic structures which may have been ring cairn variants, although no human remains were encountered. The cairns appeared to be mostly clearance cairns, although one contained a series of complex deposits around a natural rocky knoll with prominent fissures during the Neolithic. Finally, a possible enclosure may in fact be a Neolithic ring-mound.

This publication presents the survey and evaluation evidence, compares it to the Kintore sequence, and places it in a regional and national setting with a landscape perspective. The key conclusions from the project are, despite the proximity of the two locations, two-fold. Firstly, that there are distinctions in the distribution and size of roundhouses/hut circles between Kintore and Balbithan, presumably reflecting differences in economy and land use, as well as responses to climatic change in the second and first millennium BC. Secondly, as could easily be predicted, there is a stratum of surviving evidence from Balbithan which has been completely destroyed at Kintore, and which allows far more detailed interpretation of the site sequence.

Ultimately, the overall programme of work is an important reminder that while morphological forms such as hut circles can be readily identified through walkover surveys, that there is great value in targeted evaluation of them to verify such observations, build chronological frameworks, and to help identify past underlying social-political structures as part of landscape archaeology research programmes.

Introduction

Balbithan Wood is located to the immediate north-east of Kintore, Aberdeenshire (Figure 1, NGR: NJ 8018 1808, CANMORE NJ81NW 179) and sits on a ridge immediately above the River Don. It is a commercial conifer plantation owned and managed by the Forestry Commission Scotland, now Forestry and Land Scotland (FLS) and is the biggest element of a larger stretch of woodland that contains a series of upstanding prehistoric features. The ground was open on Roy's mid-eighteenth century maps and tree-covered in 1866, when it was known as Skene's Wood and surveyed for the 1st edition of the Ordnance Survey (OS) 6-inch map (Aberdeenshire 1870, sheet LV). The OS did not record any antiquities within the wood either then or when the map was revised in 1899 (Aberdeenshire 1901, sheet

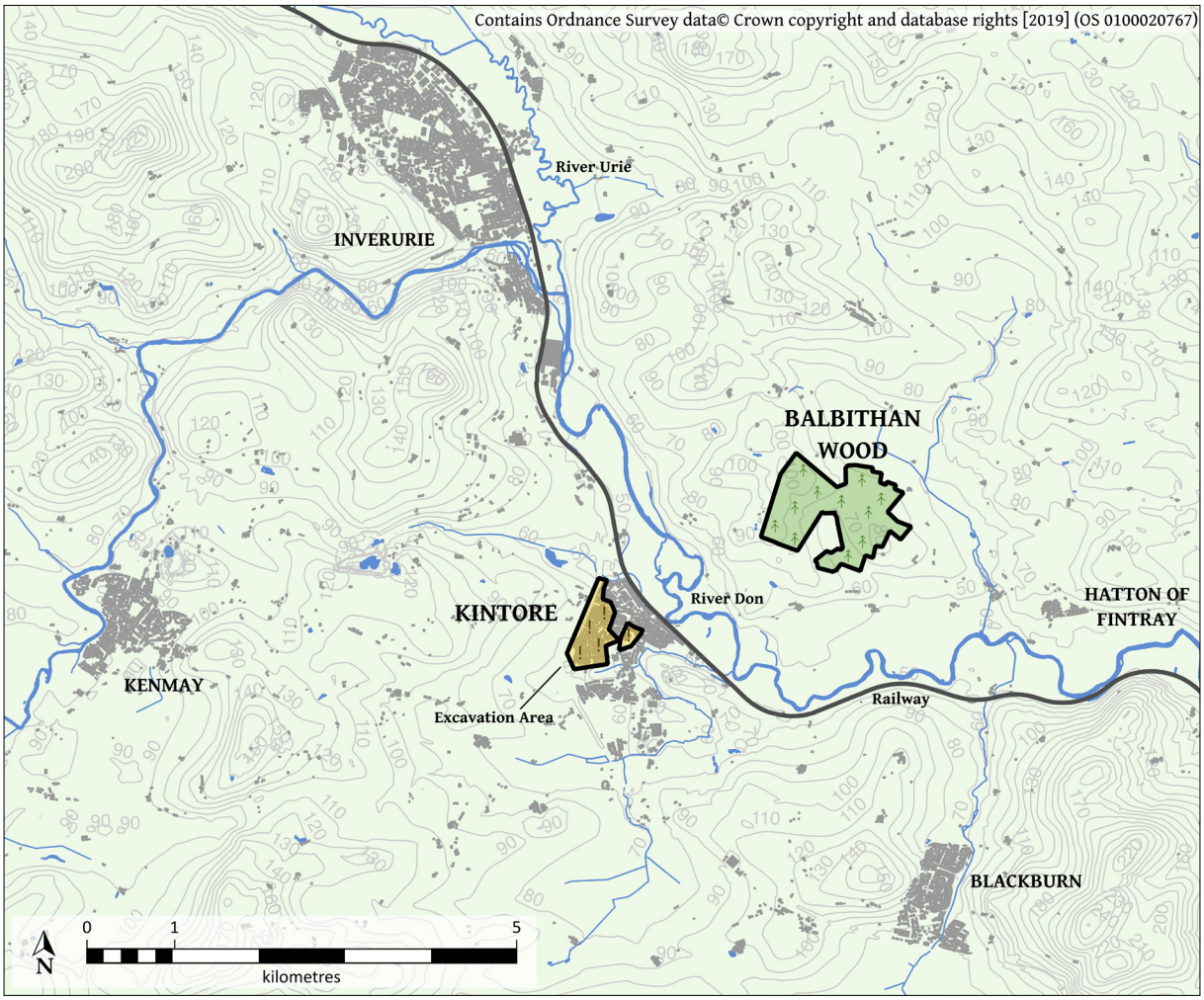


Figure 2: Location of Balbithan relative to the site of excavations at Kintore in 1996 and 2005.

LV.SW), but by the early 1920s most of the trees had been removed, and the presence of hut circles and small cairns was identified by a Mr Brown of Bankhead. The area remained open moorland until the 1950s when it was acquired by the FLS and reforested. RAF vertical aerial photographs (540/1419 F 22: 0061-2), taken in September 1954, recorded the site shortly after it was ploughed for forestry, and in 1961 the Archaeology Division of the OS mapped nine hut circles for the 1965 edition of the 1:2500 map (NJ 81/17). Another three hut circles were located in the course of the Royal Commission on the Ancient and Historical Monuments of Scotland (RCAHMS) survey and in total 24 hut circles were identified across the wider environs (RCAHMS 2007, 80). The core cluster of hut circles and cairns were recognised as Nationally Significant by Historic Scotland (now Historic Environment Scotland) and were scheduled in 2009 (SM 21483).

Between 1996 and 2005 there were a series of large scale mitigation excavations to the immediate west of Kintore (hereafter referred to as Kintore) ahead of road and housing development (Figure 2) (Alexander 2000, Cook and Dunbar 2008, Cook *et al*. forthcoming). These excavations identified an extensive series of plough-truncated roundhouses amongst other remains ranging in date from the Neolithic to the medieval, including 32 unenclosed roundhouses, the largest such assemblage excavated to date in Scotland (ibid.). Two earlier papers (Cook 2013, and Cook 2015) used the Balbithan evidence to integrate the then unenclosed settlement sequence with the enclosed settlement sequence across the Don Valley.

In summary, this expanded unenclosed assemblage identified some 70 or so roundhouses excavated in the wider area, though not all have been published. While the sample size is small,

several key patterns mapped by Pope (2003, 392-4) across north Britain are found within the Kintore assemblage. These included:

- a retreat from marginal ground around 1000 and 800 BC
- an increase in the excavation of internal pits in the LBA
- the deposition of artefacts on floor surfaces in the MBA and LBA
- the standardization of roundhouse entrances in the LBA
- a growth in ancillary structures after 400 BC

The greatest numbers of structures are present in the MIA (11) and the LBA (9), both representing significant increases from the previous periods of MBA (4) and EIA (4) and of course a corresponding drop from the LBA (9) to EIA (4). With regard to structure size, two factors are worth drawing out: in general, structure size marginally decreased over time, except from the MBA to LBA (50 m2 to 80 m2) and the MIA to LIA (63 m2 to 105 m2), and that the single largest structures of the Kintore sequence were present in the LIA. The bulk of the sequence is represented by isolated structures: only MIA settlement comprises clusters of contemporary structures (an imprecise grouping based on visual impression) and external features.

In 2005 the author proposed to sample excavate two of the hut circles and two associated clearance cairns in Balbithan (Cook *et al.* forthcoming). This formed an element of the *Kintore Landscape Project* which, with another project *Hillforts of Strathdon*, aimed to place the plough-truncated sequence from Kintore into a wider landscape setting, and as such, sampled other monuments such as forts, cairns, lithic scatters and crop mark enclosures (Cook *et al*. forthcoming, Cook 2013). In large part, this work was aided by the RCAHMS survey of the Don Valley (2007), of which the author was given an early unpublished copy. However, it was clear during this initial phase of work that Balbithan contained a greater volume of remains than had been identified by the RCAHMS survey.

The RCAHMS 2007 volume summarises the wider environmental background and setting of Balbithan and Kintore. The Balbithan landscape is higher (70-100 m OD) than Kintore (50-60 m OD) and more marginal. With regards land capability, the land around Kintore is Class 3.1 while Balbithan is Class 3.2 (Birnie *et al.* 2010) meaning that Kintore can produce a much wider range of crops. Regarding geology - while Kintore has an underlying sand and gravel substrate, Balbithan is much rockier with exposed bedrock (BGS 2021). Intriguingly, in a recent review of Scottish unenclosed settlement, Pope (2015, 180) assesses the difference between lowland and upland as 100 m OD, so in this context both Balbithan and Kintore are lowland landscapes.

In 2011 the author returned to Balbithan to embark on a five year programme of survey and key-hole evaluation to map, characterise, ground truth[1] and date the various remains in the wood (Figure 3). This was primarily aimed at hut circles, though by necessity some cairns were also sampled to determine their relationship to the hut circles. In addition, this would also provide a more useful comparator to Kintore and was designed to develop larger more nuanced research questions for putative further seasons at the site. While this work was in progress, FLS asked archaeologist Colin Shepherd to identify all potential archaeological features in order to ensure that they would be safeguarded during felling and replanting operations. Together, with local volunteers from the North East Scotland Archaeological Research Society (NESARS), Colin Shepherd and the author undertook repeated walkover surveys through the wood, each time increasing the number of identified prehistoric features, albeit with two sets of numbering systems (Shepherd 2013). Finally, in 2014 and 2015 David Connolly, on behalf of Aberdeenshire Council, systematically assessed each possible feature (filtering out erroneous ones) and then renumbered each cairn and hut circle with the data being provided to Aberdeenshire Council HER (Connolly 2015). This current report uses this latter numbering system. The project surveyed 27 upstanding hut-circles and 217 cairns of which seven cairns and eight hut-circles were sampled. In addition, two putative hut circles were confirmed to be natural features while two additional hut circles and an enclosure were located and sampled. In addition test pits were dug, identified by TP followed by their number.

1 Information provided by direct observation.

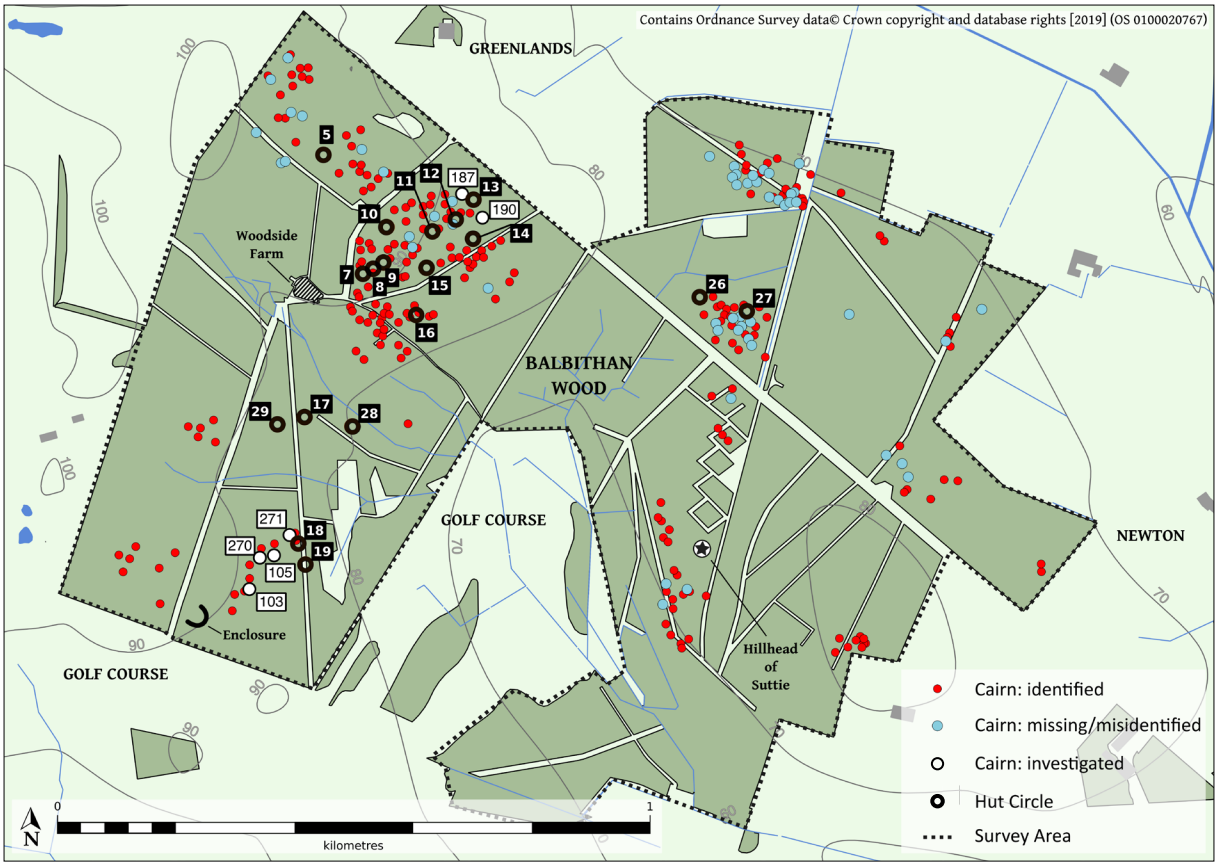


Figure 3: Overall distribution map of hut-circles and cairns, including potentially misidentified cairns.

In 2013, Joanna Lawrence undertook a soil sample analysis of Hut Circles 17, 18, 19 and 28 (Figure 4) as part of an undergraduate honours thesis in the Department of Anthropology at the University of Wisconsin-Madison (see *Soil chemistry*).

This publication combines the radiocarbon dates and structural results from both sets of fieldwork (2005 and 2011 to 2015 seasons), however, the lithic and pottery reports focus on the second set of works only (2011 to 2015 seasons).

Methdology

Terminology

The publication uses a number of technical phrases, which while commonly used by archaeologists are perhaps unfamiliar to the general reader: *roundhouse, hut circle, cairn, clearance cairn and ring cairn*. In addition, the publication is structured as a discussion reflecting the author's investigation of features that were initially recorded on the basis of their physical appearance as cairns and hut circles, therefore another term was coined to reflect the more nuanced interpretation achieved through the evidence of excavation: *non-domestic hut circles*.

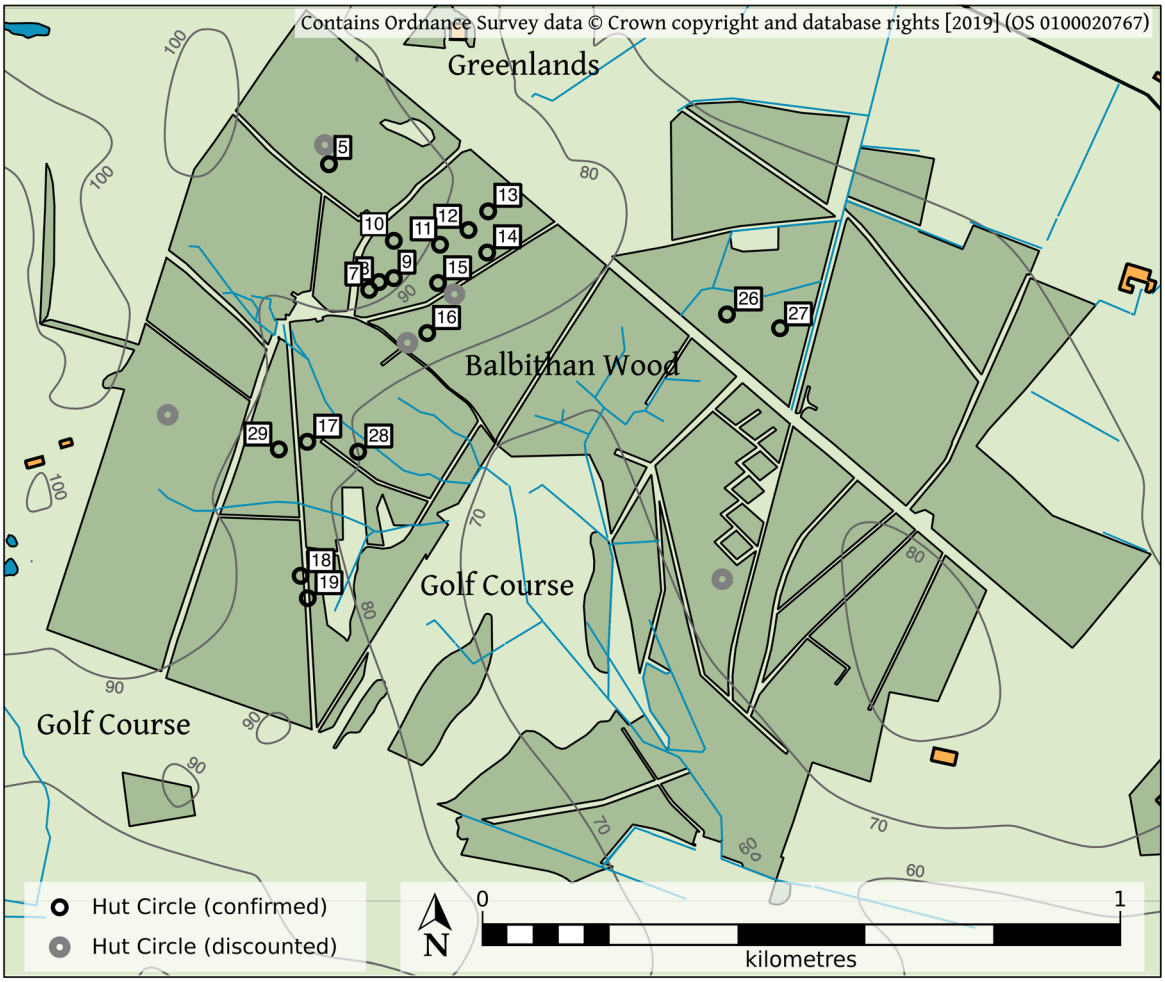
A *roundhouse* is a circular domestic dwelling or house of stone or wood or both, in which people lived and in this publication is used to describe the remains of upstanding stone houses that have been destroyed over time and all that survive are their truncated foundations.

Hut circle is used to describe the remains of a collapsed roundhouse, which survives as an upstanding circular stone outer wall.

A *non-domestic hut circle* is a structure that looks like a collapsed roundhouse but has no evidence for domestic activity and may be have been constructed for non-domestic activity.

Cairn is the term used to describe a discrete pile of stones.

A *clearance cairn* derives from agricultural activity.



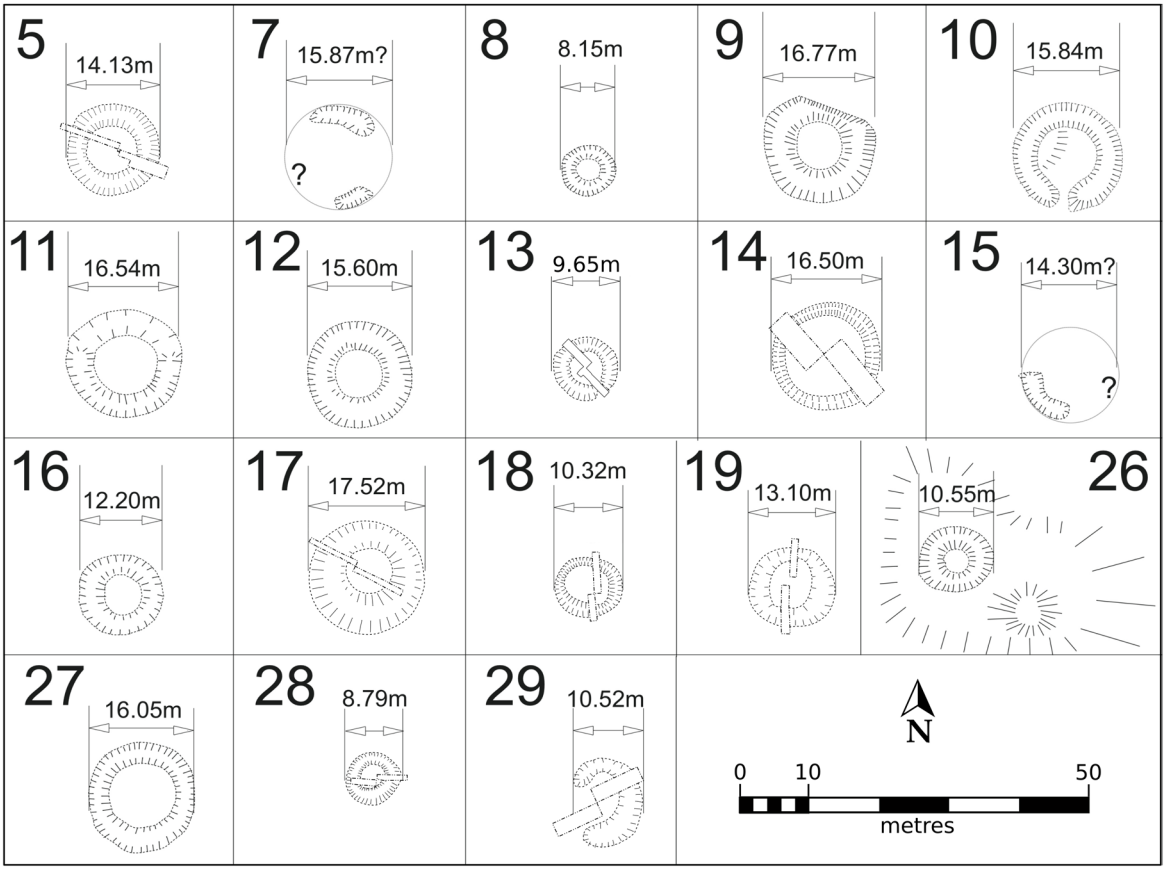


Figure 4: Distribution of hut-circles with size comparison.

A *ring cairn* is a ritual structure constructed for non-domestic activity, but which without excavation looks like a hut circle.

The surveys

The 2011 survey of prehistoric features conducted by Colin Shepherd, was based on the RCAHMS survey (2007, 80), and was uploaded onto a handheld Garmin GPS CX 60, which was combined with a paper map printout of the features with annotations by the author. Each location was revisited and most had been marked by a yellow tape wrapped around a tree to aid visibility.

In the event that the site could not be located immediately, a 10 m search pattern was implemented around the GPS reading in addition to the inspection of nearby known monument points and attempts to detect it using relative positions.

If a feature could not be located, this was recorded, as were sites that were deemed to be either natural or suspected to be natural – such as bedrock outcrops to tree boles. Each confirmed monument was then measured for maximum length, width and height before being photographed (though this was often problematic due to bracken coverage). Finally, the GPS coordinates were again checked and recorded using OS GB 1936 coordinate system. The intention was to provide Aberdeenshire Council HER with a GIS layer that could be interrogated based on location, presence/absence or dimensions. A copy was also supplied to FLS.

The excavation

All excavation was undertaken by hand following the Chartered Institute for Archaeologists (CIfA) standards and guidance. Excavation was limited and tended to comprise opposed 1 m wide trenches designed to confirm the overall dimensions of each feature, characterise its structural elements and recover dating evidence. A key element of this approach was to ground truth the results of the surveys as without, excavation assumptions become facts. The project's starting point was that the surveyed features simply represented the most visible elements. Indeed, the project sampled three previously unknown structures, Hut Circles 28 and 29 and the Enclosure. In addition, the precise sizes and location of the cairns was also unknown prior to the project. It would therefore be more accurate to describe the field interventions as evaluations: the iterative sampling of a complex but degraded multi-period prehistoric palimpsest agricultural landscape.

The project started in the north-western section of the wood and during subsequent seasons moved from the north-east end to the south-west portion of the wood, with a tendency to try to excavate large and small examples of both cairns and hut circles (Table 1).

Year	Hut Circle	Cairn
2005	13 and 14	187 and 190
2011	5 and 17	
2012	19 and 28	
2013	18	105, 270 and 271
2014	29	103
2015	Enclosure	103

Table 1: Structures sampled in each year.

With each season the author grew more familiar with the subtle and indistinct nature of the surviving features, and the techniques used were more akin to a strip and map and sample with limited and minimal subsequent excavation, but preferred a limited approach as this is the most ethical position. The sites are unique pockets of preserved information and as excavation is destructive, any intervention must be justified. In general, after deturfing, no more than 20% of any one monument was targeted, and a key-hole excavation within each trench, comprised less than 1% of the structure. This deliberate approach was intended to provide a limited methodology to allow a return to the site with more focussed research questions (see Afterword). Such an approach is favoured by both *The Iron Age Research Agenda* and the Scottish Archaeological Research Framework (Haselgrove *et al.* 2001, 5, ScARF 2012a, Section 6.9). In each of the trenches, attention was paid to the impact on the monuments from forestry operations, trees, bracken and burrowing animals. Each fieldwork season comprised 10 days of excavation with local volunteers and students.

In addition, a series of 1 m by 1 m test pits was excavated around each hut circle or cairn at the cardinal points and designed to recover lithic artefacts. This was undertaken to provide some

form of indication regarding the nature of any lithics within cairns or hut circles i.e. were they in situ or residual. Occasionally, more test pits were excavated in order to explore potential lithic scatters. Finally, a number of cairns were sampled to determine if they were merely clearance cairns or contained more complex deposits.

Results

Survey

The 1996 RCAHMS survey (2007, 80) identified 25 hut circles, although observation and excavation of these confirmed 23 of this number, and two were established to be non-archaeological. The RCAHMS survey also identified, but did not map, both clearance and non-clearance cairns throughout the wood. At the conclusion of the current project it was confirmed that there were at minimum 27 hut circles (18 of which were located in the FLS landholding), 217 cairns and a prehistoric enclosure (Figure 3, Plates 1 and 2). The various features are situated between the 70 m and 100 m contours and are not present at either the highest points in the wood or the lowest locations, which were damp and boggy. Cairns are much more widely distributed than hut circles, and while there are locations with both hut circles and cairns, there are more with just the latter.

Plate 1: View of a typical cairn pre-excavation.

It is likely that there are still further features that remain unidentified and indeed only excavation will reveal their total number, as for example at Griffin, Perthshire, which was surveyed and then apparent 'gaps' were excavated (Cowley 1997, Bailey 2014). At two different locations within the wood, two hut circles remained unrecorded through four walkover surveys in different years and with ground conditions (the Ordnance Survey, the author, the RCAHMS and Colin Shepherd) and it was only during a fourth walkover in the right conditions that the structures were finally observed.

Plate 2: View of a typical hut circle pre-excavation.

The survey demonstrated that both the hut circles and cairns occurred in clusters. Some of the gaps are connected with modern management and presumably the resultant destruction of features within these areas. For example, the improved fields associated with Woodside (a farm marked on the 1st edition OS) mark a clear hard edge to the distribution of prehistoric features to its north and east (Figure 3). Other gaps will simply represent the inability to identify structures in the wood. As noted below (see *Discussion*) all of the sampled cairns lay directly on bedrock outcrops, and it may be that their surviving clusters reflect areas that could not be easily improved.

Quite what these clusters mean is unclear, and an attempt to assess the cairns in terms of size (Figure 5) (less than 5 m, 5 m to 10 m diameter and over 10 m diameter) has not revealed a pattern. However, as will be shown, the excavation has revealed prehistoric activity ranging from the Neolithic to the early centuries AD and it is likely that the pattern simply reflects changing use and differing foci over 4,000 years, combined with subsequent selective destruction during the last 1,000 years of agriculture and forestry.

The external diameters of hut circles ranged in size from 8 m to 18 m (Table 2), which falls within the range identified by Pope's (2003, 101) review of North British roundhouses. However, such a broad range may also relate to a number of factors such as chronology, family size, socio-political factors, status and function. In addition, without excavation it can be difficult to distinguish

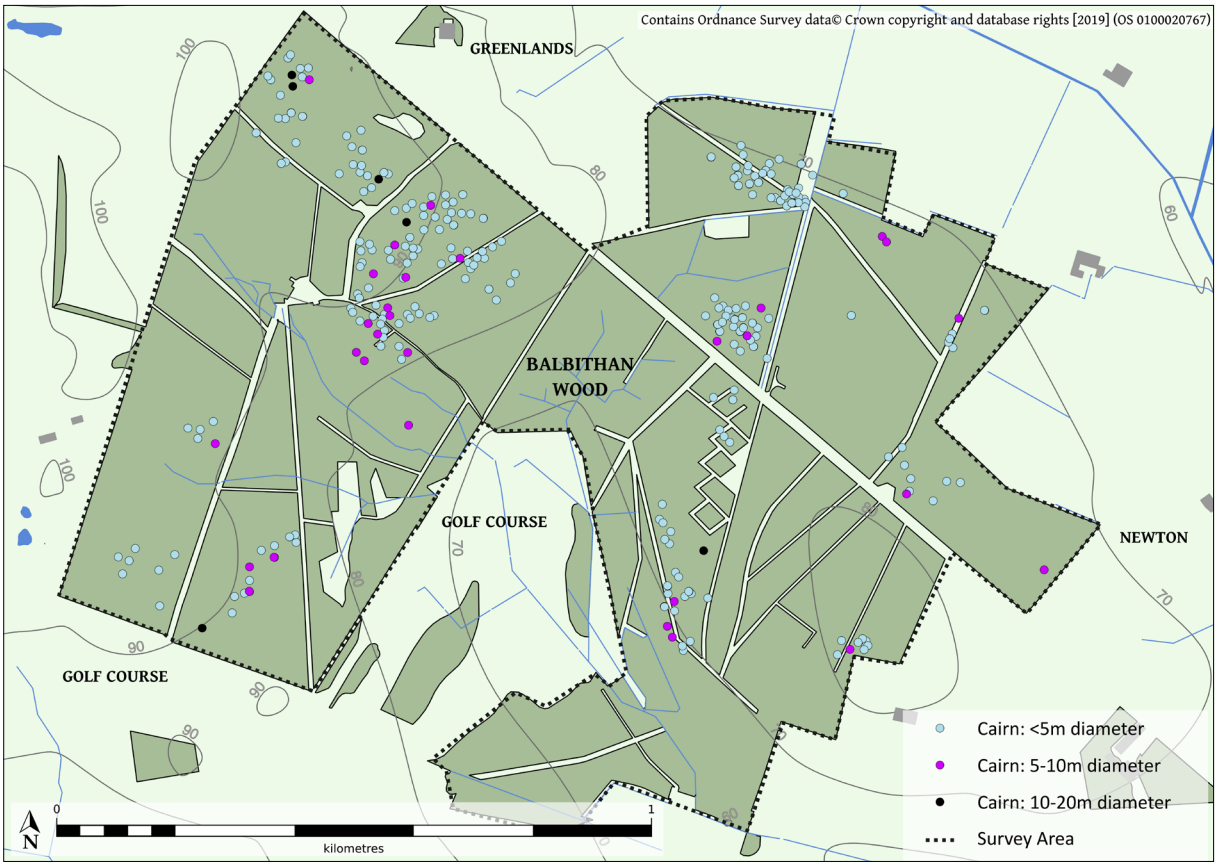


Figure 5: Distribution of cairns, colour coded by size.

Hut Circle	External diameter (m)	Sampled	Wall type	Ring ditch	Hearth	Entrance	In situ pottery	Redeposited pottery	Coarse stone	Structural phases
5	15.5	✓	Wall	SE*	SE	SE			✓	2
7	16?									
8	8									
9	17									
10	16					S				
11	16.5									
12	15.5									
13	15.5	✓	Wall	NE*		SE	✓			2
14	11.5	✓	Wall			SE				1
15	14									
16	12									
17	18	✓	Bank	SW* and SE*	NW	E?				1
18	10.5	✓	Bank					✓		2?
19	11.5	✓	Bank					✓		1
26	10.5									
27	16									
28	9	✓	Bank	SW	NE					2
29	12?	✓	Bank	SW*		SW				2?

Table 2: The variation in hut circle characteristics.

between a hut circle and a ring cairn, which have clear non-domestic functions. It should also be noted that, as might be predicted, the field survey overestimated the actual size of the structures as revealed by excavation (compare Table 3 with Figure 4).

Evaluation

Over the six seasons of fieldwork 31 trenches and 87 test pits were excavated in relation to nine putative hut circles, six cairns and an enclosure. A total of 320 lithics and fragments from 93 pottery vessels were also recovered from the project. However, it is clear that older objects became incorporated into more recent structures through accident and design. The evaluation fieldwork results are presented in both chronological and thematic order: lithic scatters, buried soil surfaces, an enclosure, cairns and putative hut circles (it is worth noting that the term hut circle is used to refer to the Balbithan structures in preference to roundhouse).

Before the results are presented, it is worth making some high level observations on the management of the structures within the wood. It is well established that while forestry ploughing is highly destructive of archaeological features, useful information can be recovered if a structure can be recognised (McIntyre 1998, Bradley 2014). However, this basic recognition and identification of an archaeological feature becomes impossible after the first rotation (ploughing, planting and felling), indeed in the author's experience the best time to recognise features is before the felling of the first rotation when the trees are mature (Plates 3 and 4). Wind blow, bracken etc. all obscure the evidence, but felling and the resulting spread of brash can completely obscure all but the biggest features.

The greatest threats to such features are, however, burrowing animals and bracken, issues which are well known and recognised (Mills and Rees 1999, Dunwell and Trout 1999). In the active landscape of Balbithan, every single trench revealed evidence for impacts from both bracken rhizomes or burrowing animals and indeed several portions of hut circle banks collapsed during excavation due to their undermining by burrowing animals (Plates 5 and 6). Given this, the author feels that there is a limited time to recover information from these structures before their complete homogenisation.

Plate 3: Mature trees in a structure under excavation.

Plate 4: Tree roots in a structure under excavation.

Plate 5: Animal burrows exposed by excavation.

Plate 6: Animal damage caused to a structure under excavation.

Lithic scatters

Within the second phase of fieldwork a total of 320 lithics were recovered from 36 (45%) of the test pits and 24 (89%) excavated trenches, and were found across the entire wood. The average number of lithics recovered from each 1 m by 1 m test-pit was 2.4 (Table 3). Dickson's lithic analysis (below) indicates they date from the late Mesolithic to the late Bronze Age (LBA). Radiocarbon dating from the site gives a range of activity from the Neolithic to the Roman Iron Age, which clearly indicates that some material was residual. Equally, given the presence of middle Bronze Age (MBA) and LBA structures, it is possible that lithics from their environs are contemporary with their use i.e. that knapping took place outside the structures and, as will be argued, not all the structures are domestic. However, it should be noted that worked lithics were not present in significant quantities in the excavated roundhouse sequence at Kintore (Engl 2008), perhaps suggesting that the bulk of the Balbithan lithics were residual.

Structure	Test-pit	Number of lithics
5	1	11
5	12	1
5	15	4
5	3	1
5	6	1
5	7	2
17	108	1
17	101	1
17	103	1
17	104	2
17	108	13
17	109	5
17	110	7
17	111	3
18	100	1
18	101	2
18	104	19
18	105	3
18	107	4
18	108	5
18	109	3
18	110	2
18	111	2
18	112	1
18	113	1
19	220	1
19	221	4
19	222	2
19	226	6
19	227	1
19	231	5
28	202	1
28	204	1
28	212	10
28	213	1
28	214	30
28	215	8
28	216	1
29	701	1
29	706	2
29	708	20
	Total lithics	190

Table 3: Number of lithics per test-pit.

Table 3 lists the numbers of lithics from each test pit. Six test pits had 10 or more lithics (Hut Circle 5-TP 1, Hut Circle 17-TP 108, Hut Circle 18-TP 104, Hut Circle 28-TP 212 and TP 214 and Hut Circle 29-TP 708) and of these two had 20 or more (Hut Circle 28-TP 214 and Hut Circle

29-TP 708). Dickson identified diagnostic late Mesolithic/Neolithic material (see *Lithics and coarse stone tools*) in the assemblages around Hut Circles 5, 18, 28 and 29. While the absence of such diagnostic material from Hut Circle 17 does not preclude it being an early prehistoric lithic scatter, it does raise the possibility that it is later in date.

While it is always possible that stray early prehistoric worked lithics were collected by later people, when the presence of diagnostic late Mesolithic/Neolithic material is combined with larger volumes of undiagnostic lithics as seen around Hut Circles 5, 18, 28 and 29, this suggests the presence of Mesolithic/Neolithic lithic scatters. These four sites occupy three key locations across the wood (Figure 4): Hut Circle 5 is located near the highest point of the wood, while Hut Circles 18, 28 and 29 are on slightly higher ground to the north and south of a small burn in the wood. All the locations provided higher raised ground and excellent viewpoints. Presumably such scatters represent small elements of Mesolithic and/or Neolithic settlement patterns in the wider Don Valley and indeed the Dee (Murray and Murray 2014, Wickham-Jones *et al.* 2016).

Buried soil surfaces

A total of six cairns and eight hut circles were explored by the project and of these two cairns 103 and 105 and two Hut Circles 5 and 18 sealed buried soils (Figure 3). In all cases the soils were charcoal-rich, which is assumed to reflect the deposition of midden material from nearby settlement. However, it is worth noting that there are other potential sources of charcoal in soil such as natural forest fires and woodland clearance. Even with some level of middening it is likely that these buried soil surfaces were short term focal spots. The soil would eventually become exhausted and people would move to another plot and then another, perhaps returning to the original location after a generation. In neither case were any sealed ard marks observed. A pollen assessment was undertaken of the buried soil within Cairn 103 but the preservation of the pollen was too poor for useful analysis (Ciara Clarke, pers. comm.).

As will be seen from the radiocarbon dating[2] (Table 13), the buried soil in Cairn 103 was dated to 3605–3523 cal BC (SUERC 57509, 4799±29 BP), while those from the overlying cairn were dated to 3879–3802 cal BC (SUERC 57512, 5111 ± 28 BP) and 3642–3521 cal BC (SUERC 65805, 4784 ± 30 BP), suggesting a high degree of reworking. In contrast, Cairn 105, which had undergone more than one phase of construction, the buried soil was dated to 3334–3265 cal BC (SUERC 49521, 4497 ± 29 BP), while the cairn fill was dated to cal AD 209–350 (SUERC 49518, 1766 ± 29 BP). The soils under Hut Circles 5 and 18 were both MBA in date: 1669–1522 cal BC (SUERC 36871, 3315 ± 25 BP), and 1561–1440 cal BC (SUERC 49520, 3241 ± 29 BP) respectively.

Cairns

As described above, Balbithan contains a minimum of 217 cairns (Figure 5). The vast majority of these appear to be small featureless clearance cairns under 5 m diameter, although it is clear from the project that even the smallest cairn can contain complex material (cf. 271). In total six cairns were explored, two small clearance cairns 187 and 190 and two larger cairns 103 and 105. In addition, two further cairns were discovered, one within a test pit (271) and another in an extension to one of the large cairns (270).

It is worth noting that many smaller cairns lay in immediate proximity to larger structures, for example, Cairn 187 and Hut Circle 13, and it may have been expected that if such material was older it would have been quarried to be included in the structure, and if it was later that it might have been dumped outside the hut circle e.g. Hut Circle 17. However, all the excavated cairns were built at least partially on bedrock and thus continued to mark an area that could not be cultivated. This implies either that much of the bedrock covered by these cairns had been stripped of soil (perhaps reflecting areas stripped of soil for construction) and/or that there were extensive bedrock outcrops in the landscape at the time of their building.

2 All radiocarbon dates are quoted at 2 sigma.

Cairn 103 *(Figures 3 and 6, Plates 7-15)*

Cairn 103 was roughly oval in shape, orientated NW/SE, measured 6.8 m by 5.2 m and survived up to 1.2 m high. Both its south-west and north-east sides had been impacted by forest ploughing. Two trenches were placed over it: Trench 30 which reopened Trench 27 from 2014 and Trench 31 which reopened Trench 26 from 2014 (Figure 6).

The cairn was constructed on a bedrock knoll (3002) (Plates 7 and 8), which contained two fissures, (3018 and 3019), on its north-eastern face, although these extended beyond the excavated area (Plates 9, 10 and 11). The western fissure (3018) measured at least 0.1 m wide, 0.6 m long and 0.3 m deep, although it was not fully excavated, but it was filled with 3016 and 3017, The upper fill (3016) comprised beige brown sandy silt, up to 0.12 m thick, and 90% stone made up of small tightly packed rounded to sub-rounded stones. 3016 lay above 3017, a dark brown sandy soil with again 90% tightly packed, rounded to sub-rounded stones. Hazel charcoal from 3017 gave a date range of 3642–3521 cal BC (SUERC-65805, 4784 ± 30 BP).

Plate 7: Cairn 103 before excavation, viewed from north.

Plate 8: Cairn 103 after turf removal, viewed from south.

Figure 6: Plan and sections of Cairn 103 with location of finds.

Plate 9: Cairn 103 under excavation, from west.

Plate 10: Cairn 103 under excavation, from south.

Plate 11: Cairn 103 under excavation, from west.

The eastern fissure (3019) (Figure 6, Plates 11, 12 and 13) measured at least 0.1 m wide, 0.6 m long and 0.4 m deep, though it was not fully excavated. It was filled with 3020, which comprised beige brown sandy silt, up to 0.4 m thick, and 90% small tightly packed rounded to sub-rounded stones. The excavated portions of the fissures contained no pottery but a rubber/grinder cobble tool (SF 2015-090a), and an indeterminate milky quartz chunk (SF 2015-092a), were recovered from 3016 (see *Lithics and coarse stone tools*).

Plate 12: Cairn 103 pre-excavation view of fissures, from south.

Plate 13: Cairn 103 bedrock fissures after excavation, from south.

To the north-west of the bedrock face the cairn material (3003=2607=2604=3104), which comprised angular to sub-angular stones measuring on average 0.3 m by 0.4 m by 0.2 m, was roughly stepped, creating a platform. The soil within the cairn (3004=2603=3105) was homogenous and indistinguishable from the topsoil (2602=3101), however, the soil over the low platform, which overlay 3003 and 3004 was less homogenous and comprised 3005, a pale orange to yellow sandy soil up to 0.18 m thick, which contained numerous flecks of charcoal and redeposited bands of natural subsoil (2704). Hazel charcoal from (2704=3021) gave a date range of 3605–3523 cal BC (SUERC-57509, 4799 ± 29 BP).

To the south-east of the knoll the bedrock flattened out and contained a series of fissures, into one of which another hammer stone/ rubber was placed (SF 2015-89). Elsewhere pottery sherds were located both on the exposed bedrock and within the cairn fill which comprised a dense layer of tightly packed rounded to sub-rounded stones (3104=2607), measuring up to 0.4 m by 0.2 m by 0.3 m. The soil matrix of the cairn material (3105=2706=3004) comprised dark black organic-rich material up to 0.2 m thick. In 2014, oak charcoal from (2603=3105=3004) provided a date range of 3879–3802 cal BC (SUERC-57512, 5111 ± 28 BP). While no kerb to the cairn material could be identified there was a slight concentration of larger stones towards the edge of the cairn material, however this had been impacted by forest ploughing.

A total of 27 lithics, four coarse stone tools and portions of 41 pottery vessels (comprising 184 sherds) were recovered from the fill (3105 and 3104) of the cairn. The pottery is Neolithic in date (see Prehistoric Pottery) and the lithic objects are late Mesolithic/early Neolithic in origin. While small sherds of pottery were recovered across the cairn, larger sherds were confined to its core perhaps indicating a survival bias within Trench 31 (Plates 14 and 15). Lithics were concentrated around the south-west fringes of the site and comprised one blade SF 2015-067a and an end scraper SF 2015-005a. The balance of the assemblage comprised flakes of primary, secondary and tertiary removals. One flake displayed attributes consistent of production during bipolar reduction, whilst a second piece had platform features reminiscent of being struck with a hard hammer. Twelve flakes were burnt.

Analysis

An exposed lump of natural bedrock with a series of natural fissures became a focus for activity during the fourth millennium BC. Presumably this activity involved first the excavation of the fissures then their infilling, which appears to have involved soil and stones as well as some coarse stone tools. In turn, the fissures to the south-east were covered with unabraded and unweathered sherds from multiple pottery vessels, which in turn were covered with stones, implying deliberate deposition. The fringes of the cairn were associated with struck lithics, the majority of which were debitage, but it is not clear if these were deliberately deposited on the cairn or were the result of lithic working activity in its vicinity. The sides of the cairn were subsequently impacted by forest operations.

Plate 14: Cairn 103 core of cairn, from north.

Plate 15: Cairn 103 pottery scatter within cairn, from west.

Cairns 105 and 270 *(Figures 3 and 7-9, Plates 16-20)*

Cairn 105 was roughly oval in shape and measured 7.5 m E/W by 6 m N/S with a tapering appearance caused by it being avoided by the forest ploughing to either side. Two trenches were excavated across it: Trench 11 was located over its north-western quadrant. Trench 13 was located over the eastern end of the cairn and Trench 14 extended Trench 13 to the west (Figure 7, Plates 16-18).

Plate 16: Cairn 105 during excavation, from north.

Plate 17: Cairn 105 under excavation, from north-east.

Plate 18: Working shot of trenches across Cairn 105, from east.

Figure 7: Plan and sections of Cairn 105.

At the core of the cairn was either a lump of bedrock or a glacial erratic (1306). The cairn sealed a buried soil 1105, from which two flint flakes were recovered (SFs 2015-020 and 2015-021). A fragment of alder charcoal from 1105 gave a date range of 3346–3096 cal BC (SUERC-49521, 4497 ± 29 BP).

The cairn comprised sub-angular stones (1302=1102) measuring on average 0.4 m by 0.35 m by 0.3 m, with an irregular outer kerb on the north-eastern quadrant (1103), which comprised a series of large rounded and sub-rounded stones measuring 0.65 m by 0.35 m by 0.35 m. To the south-west there may be two phases to the cairn with an inner (1303) and an outer (1304) kerb. Alder charcoal from the soil fill 1102 of the cairn gave a date range of cal AD 139–37 (SUERC-49518, 1766 ± 29 BP).

To the east and west of the cairn core there seem to have been slight linear extensions to the cairn and a smaller cairn (270) was uncovered in Trench 15 (Figures 8 and 9, Plate 19), which was associated with a leaf-shaped arrowhead broken in two (SF 2013-0029a) (Figure 46, Plate 20). The linear arrays of stone may represent later phases of agricultural stone clearance, perhaps associated with the later date from Cairn 105.

Plate 20: Leaf-shaped arrowhead SF 2012 0159a as found by Juliette Mitchell.

Analysis

Cairns 105 and 270, and their associated material appear to be multi-phase clearance cairns with an origin in the Neolithic and reuse in the late Iron Age. The presence of a charcoal-rich soil under Cairn 105 may suggest earlier human activity prior to the cairn's construction.

Plate 19: Cairn 270 under excavation, from north-east.

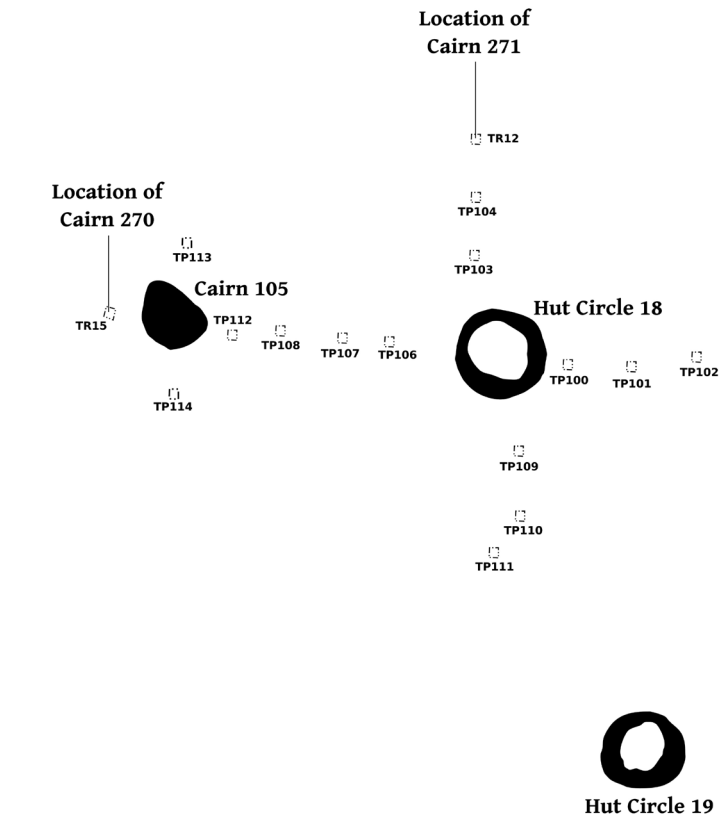


Figure 8: Distributions of test-pits around Cairns 105 and 270.

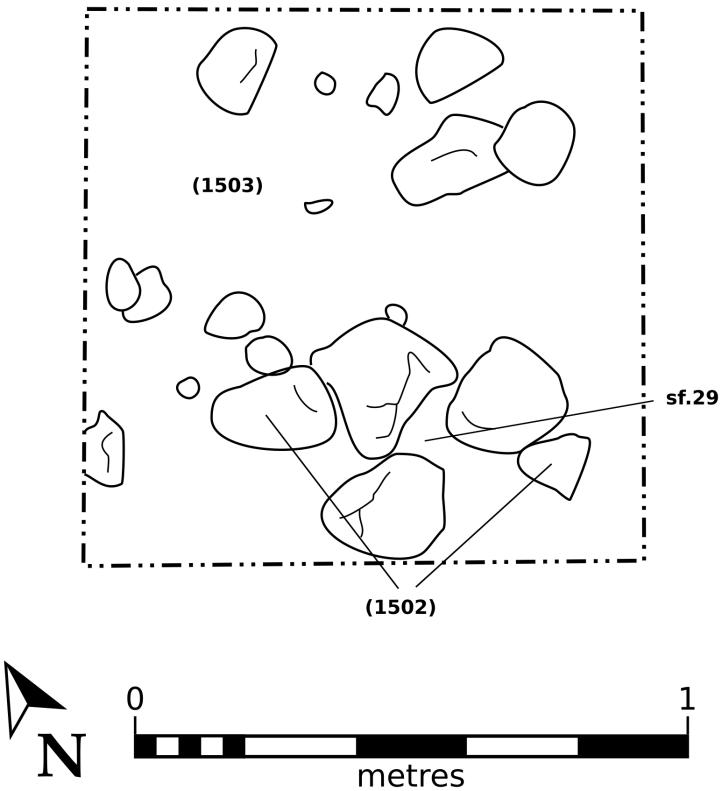


Figure 9: Plan of Cairn 270.

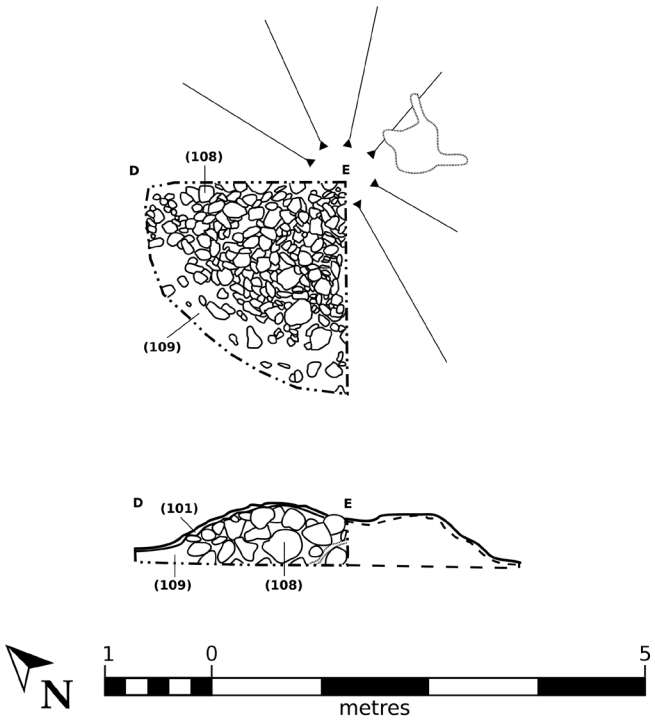


Figure 10: Plan and section of Cairn 187.

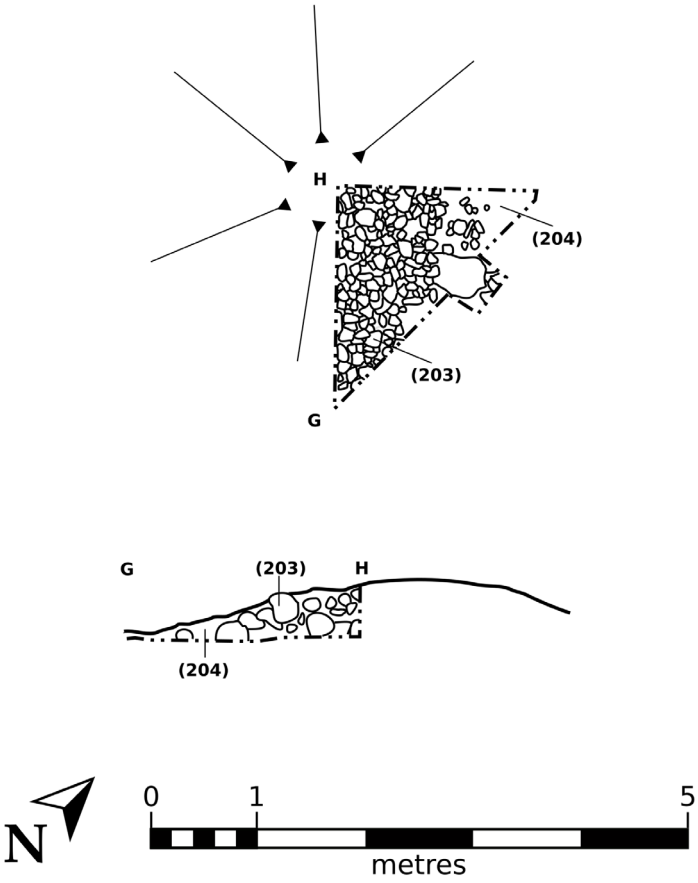


Figure 11: Plan and section of Cairn 190.

Cairns 187 and 190 *(Figures 3, 10 and 11)*

Both clearance cairns measured 4 m by 4 m by 0.8 m high and were located immediately to the west of Hut Circles 13 and 14. In both cases 25% of each cairn was cleaned and excavated. The clearance cairns comprised rough dumps of angular and sub-angular stones, on average 0.15 m by 0.1 m by 0.06 m, located on bedrock outcrops. No artefacts or features were observed during the excavation and there was no physical relationship with the hut circles.

Cairn 271 *(Figures 3 and 12, Plates 21 and 22)*

Trench 12 was located to the north of Hut Circle 18 and represents an expansion of what had been TP 105, and measured 1.4 m by 1 m (Figure 12). The topsoil (1201) comprised mid-brown, organic-rich, heavily bioturbated soil up to 0.15 m thick. At the centre of the trench, directly under 1201 and over the natural orange subsoil (1203) lay a cluster of sub-angular to sub-round stones, which measured 0.2 m by 0.25 m by 0.15 m. The cluster measured 0.5 m by 0.5 m and is tentatively identified as a damaged cairn (271), which had been disturbed by a forest plough. Immediately to the north of the cairn was a cluster of nine pebbles (SF 2013-010a-I, Figures 37 and 38) in context 1204, the majority of which were found cortex face up, which appeared to have been deliberately placed at the core of the cairn (Plates 21 and 22). These flint pebbles comprise six flaked or partially flaked cores: two are refitted pieces forming a complete pebble, which has been split using the bipolar technique and a third pebble fragment is also split from its parent nodule using the same technique. It is possible that the material represents a cache of raw material and the fact that two pieces can be refitted suggests that the assemblage is still within or very near to its primary depositional environment.

Interpretation

Neither the nature or date of Cairn 271 is clear, but it appears to have been reduced by forestry activities. Nonetheless, it would appear to relate to the deposition of a distinctive group of flint pebble cores. This may represent a deliberate cache of raw material that its depositor had planned to return to and exploit, or some form of structured deposition around Cairn 18. However, what is clear is this type of structure would not have survived in a modern ploughed landscape and was not visible in the walkover survey.

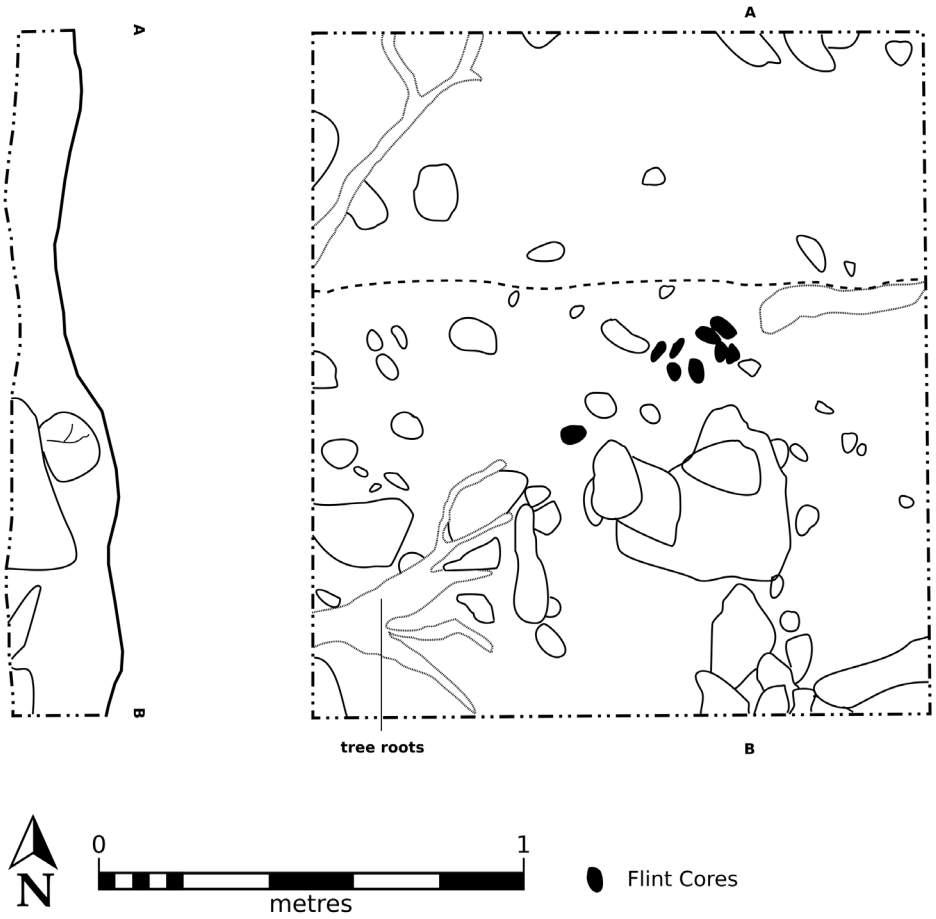


Figure 12: Plan of Cairn 271.

Plate 21: Cairn 271 view of lithic cores within Trench 12, from west.

Plate 22: Cairn 271 detail of lithic cores within Trench 12, from east.

The Enclosure *(Figures 3 and 13, Plates 23-28)*

The enclosure comprised a semi-circular shaped bank measuring externally 22 m E/W by 20 m N/S and was located on a small knoll with commanding views to the south. The internal area measured c. 12-13 m. The western end of the enclosure was not visible and may have been impacted by either forestry activities or the later construction of a long house in its interior. Trench 33 examined the eastern arc of the enclosure bank and Trench 32 ran from the interior to the external edge of the bank (Figure 13 and Plate 24).

Plate 23: Interior of the Enclosure after cleaning, looking south-west.

The precise nature of the bank (3303) was unclear. However, at its maximum it measured up to 5 m wide and 0.6 m high and was constructed of rounded to sub-rounded stones measuring on average 0.6 m by 0.5 m by 0.2 m, and appeared to be fronted by a kerb (3307) comprising substantial edge-set stones of between 0.4 m to 0.6 m long and up to 0.25 m wide and 0.2 m high (Figure 13 and Plate 24). On the southern side, the peak of the bank was obscured by the wall of the later structure, which comprised inner (3208) and outer (3204) faces and a rubble core (3205) and may have been the base of a turf wall. It measured c. 2.4 m wide but was unexcavated. The stones were sub-rounded to sub-angular and measured up to 0.4 m by 0.3 m by 0.4 m.

Plate 24: Exterior of the Enclosure, looking north-west.

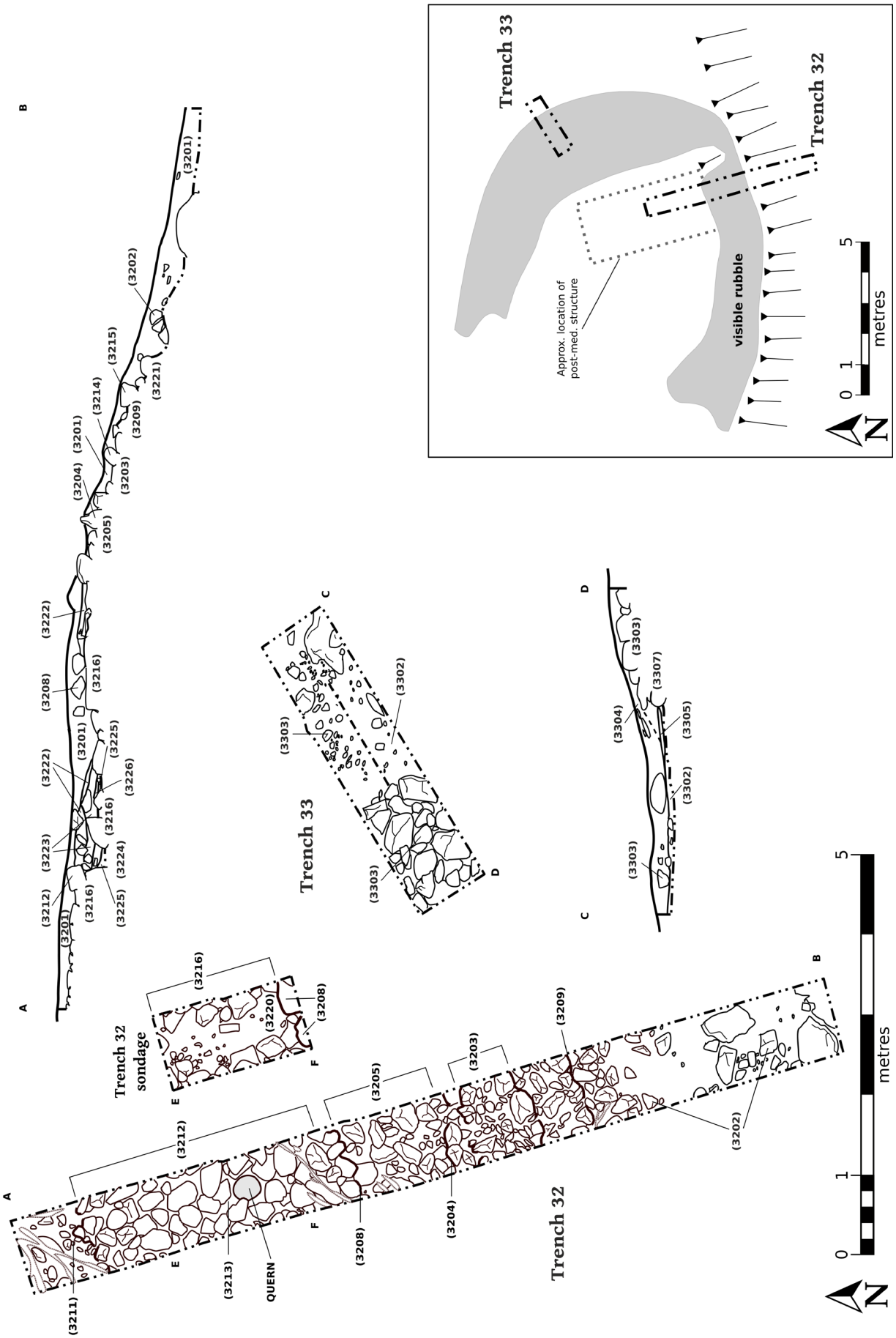


Figure 13: Plan and section of Enclosure.

The south face of the bank exterior comprised two tightly packed stone terraces, extending around 3 m. The northern of these 3202 was revetted by 3214 and measured 0.6 m wide. To the immediate south of 3202 was the second terrace (3209), which was revetted by 3215 and measured 0.6 m wide. Beyond 3215 was 3205, stone tumble from the upper stone walls and terraces, which lay directly upon the natural subsoil (3227) (Figure 13 and Plate 25). Beyond the enclosure the topsoil (3301) produced a milky quartz flake fragment and an indeterminate fragment (SFs 2015-062a and b). Excavation of iron pan-rich subsoil (3306) recovered a heavily burnt flake fragment (SF 2015-083a).

Plate 25: Sondage within Trench 32, looking south-west.

Within the interior of the enclosure, the primary deposit comprised dark brown charcoal-rich soil (3226), which lay directly on the subsoil (3227). The interface between the two soils, probably resulting from bioturbation was 3225 (Plates 25 and 26). Alder charcoal from 3225 gave a date range of 3704–3632 cal BC (SUERC-65804, 4859 ± 30 BP).

Plate 26: Section of sondage, looking north-east.

Above 3226 were a series of substantial rounded to sub-rounded stones (3216) measuring on average 0.3 m by 0.4 m by 0.5 m (Plate 27), including a saddle quern which was recorded but not recovered (Plate 28). Within 3216 was brown silty soil (3223), which was up to 0.2 m deep with 5% charcoal flakes, and some evidence for animal burrows (3224).

Plate 27: The Enclosure Trench 33, looking north-east.

Plate 28: Saddle quern from Trench 33.

Constructed upon 3216 was 3212, a compact layer of rounded to sub-rounded stones, measuring on average 0.15 m by 0.2 m by 0.25 m, which appears to have been designed to fill voids in 3216. On top of 3216 was a compact, patchy minerogenic layer (3211=3222) varying in thickness from 0.2 m to 0.05 m, from which was recovered a hammerstone (SF 2015-071a, Figure 47). From the topsoil (3201 in this area) a single undated prehistoric pottery rim fragment (SF 63) was recovered. Recovered from the same context were a number of flaked flint lithics, including a bipolar core (SF 2015-079a) and three flakes. Two of the flakes are complete and represent tertiary removals (SFs 2015-064a and 2015-082a), and the latter displays evidence for platform preparation, which is rare amongst the debitage across the assemblage as a whole.

Analysis

While the precise nature of the structure is unclear it is assumed that it was originally a complete circle, before being impacted by both post-medieval settlement and forestry operations. The site is on a prominent knoll, over the slope of which the bank was constructed. This appears to have been done intentionally to make the structure appear more impressive when viewed from the south. The presence of Neolithic material within the interior could be either residual or contemporary.

Given this, there are three main possible interpretations: a small settlement enclosure, a substantial hut circle, or a disturbed ring cairn. There are certainly both upstanding and plough truncated examples of similar sized settlement enclosures in the immediate environs (RCAHMS 2007, 94-98), although this would be at the smaller end of their range. Excavations of such structures have revealed both EIA (Connolly 2014) and early medieval dates (Cook 2011).

There are also examples of unenclosed structures of similar size in the wider area (RCAHMS 2007, 84), which, along with this example, could represent substantial hut circles. However, the presence of so many very substantial stones with the structure's interior did not suggest either an enclosure or a hut circle to the excavator, although this cannot be substantiated at present without further excavation.

The alternative is that the Neolithic material is not residual and the structure is possibly a disturbed ring cairn, although no human remains were identified. The most obvious parallel for such a structure is the ring-mound at Midtown of Pitglassie (Shepherd 1996). Sheridan (2010) has linked Midtown to a small number of Neolithic non-megalithic mounds in Scotland, including Pitnacree in Perthshire (Coles and Simpson 1965). The Balbithan enclosure is larger than Midtown but smaller than Pitnacree. Brophy (2010, 19) also discusses similar mounds in the environs of Pitnacree and gives a range of between 16 m and 23 m and heights of 1 m to 2 m.

At present there is insufficient evidence to determine which option has the best case, though the design of the bank and its opportunistic use of the bedrock knoll, which would have increased the overall scale of the structure while minimising effort, suggests a cairn or mound.

Putative hut circles

As noted above, 27 hut circles were identified and eight were sampled. It is clear that the wood is likely to contain far more such structures, which may have been obscured or destroyed by forestry, but it is also likely that some structures were destroyed in antiquity. This section describes and interprets the initial field results, before discussing the corpus of data as a whole with regard to architecture, internal features, phases and presence or absence of objects. It is also worth noting that the stone with the cairns was similar to the hut circles and it is assumed to have been gathered from the immediate locale.

Hut Circle 5 *(Figures 3, 4, 14 and 15, Plates 29 and 30)*

Hut Circle 5's internal diameter was 10.6 m and its external diameter 15.6 m. Trenches 1 and 2 were excavated across it (Figure 14). This hut circle had two phases, both of which were recorded in Trench 1: the primary phase comprised a stone-faced bank similar to Hut Circle 13, some 1.8 m wide with a soil interior. Both the inner (113) and outer (105) faces survived up to three courses c. 0.4 m high. The fill of the bank (114) comprised dark brown silty and heavily bioturbated soil.

The collapse (115, 108 and 112) from this bank, a series of mixed homogenous brown soils to either side of the primary bank, was revetted to the rear by a stone face (106), which survived up to two courses and 0.48 m high. To the front of the secondary bank was a single course of stones (103). The top of the inner face of the secondary bank was marked by a single line of stone (104), which corresponds to the location of the inner face (113) (Plates 29 and 30). This means that while the secondary bank created an internal space only slightly smaller than that of the primary bank, this secondary inner space was concave in profile and the internal collapse (112) was used as a working surface.

Plate 29: Hut Circle 05 secondary bank above the primary bank during excavation, looking south west.

Plate 30: Hut Circle 05 primary wall/bank, looking from south east.

Two phases were also identified in the eastern side of the hut circle. The primary phase comprised a bank with an inner and outer stone face that measured 1.6 m wide and 0.45 m high. The inner face (204) survived up to two courses high and the outer face (205) survived as a line of edge-set stones within a shallow cut (219). The fill (215) of the bank is a heavily bioturbated organic-rich soil and overlies 216, which comprised a thin charcoal band lying on top of the natural subsoil (201), possibly representing a pre-hut circle occupation deposit. Alder or hazel charcoal from 216 gave a date range of 1669–1522 cal BC (SUERC-36871, 3315 ± 25 BP). There appeared to be an entrance in this portion of the bank although it was blocked by the secondary bank.

The secondary phase of the bank comprised a substantial kerb of edge-set stones (202) set in a shallow cut (210), which cut into the collapse (208) from the primary bank. This kerb appeared to completely block the entrance, although it could, of course, simply have acted as a step or threshold into the roundhouse. Beyond the outer edge of the kerb lay an assemblage of cleared stone (209).

Within the interior of the structure were a series of internal features, though it is not clear to which phase they belong. There was no paving or formal surfacing within Trench 1 and only one possible posthole (102). Within Trench 2 lay an area of coarse paving (206) in a slight cut (211), measuring 1.6 m wide. Elsewhere there was no formal paving and the exposed natural subsoil (207=102), the upper surface of which contained numerous flecks of charcoal, seemed to have been used as the floor surface. Cut into this surface was a single unexcavated posthole (213/4) and a hearth comprising a single heat-shattered stone surrounded by heat-affected

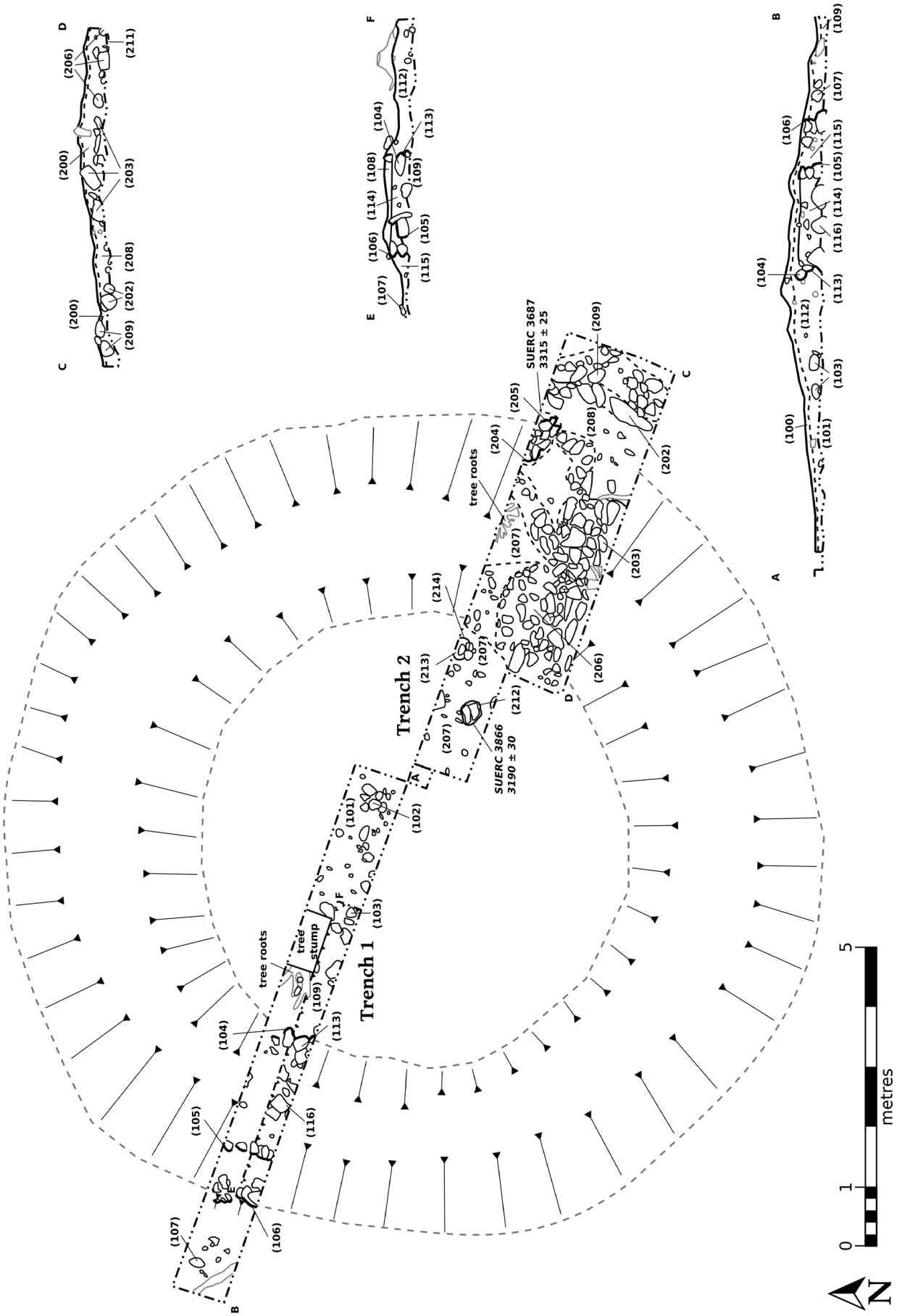


Figure 14: Plan and section of Hut Circle 05.

soil and numerous charcoal flecks (212). Alder or hazel charcoal samples from the hearth material (212) gave a date range of 1513–1414 cal BC (SUERC-36866, 3190 ± 30 BP). Beyond the exterior of the secondary bank within both Trenches 1 and 2 were a series of cleared stone deposits (107 and 209).

An assemblage of lithics was recovered from both the structure's interior and its immediate environs, but no pottery. 20 lithics were recovered from the structure and a further 20 from the test pits around it (Figure 15). As indicated above, it is likely that Hut Circle 5 was built in the vicinity of a Mesolithic/Neolithic lithic scatter, and it is assumed that only some of the lithics relate to the occupation of the structure.

Analysis

Radiocarbon dating from soil 216 gives a *terminus post quem* for Hut Circle 5 of between 1669–1522 cal BC, with at least two phases of construction, the second of which would not normally have been observed on a plough-truncated structure. The primary phase comprised a formal faced wall. However, it is not clear if the second phase of construction was also domestic as it was slight and it could, for example, have been a stock enclosure. While some of the lithics recovered will relate to its use, it is likely that the majority are residual.

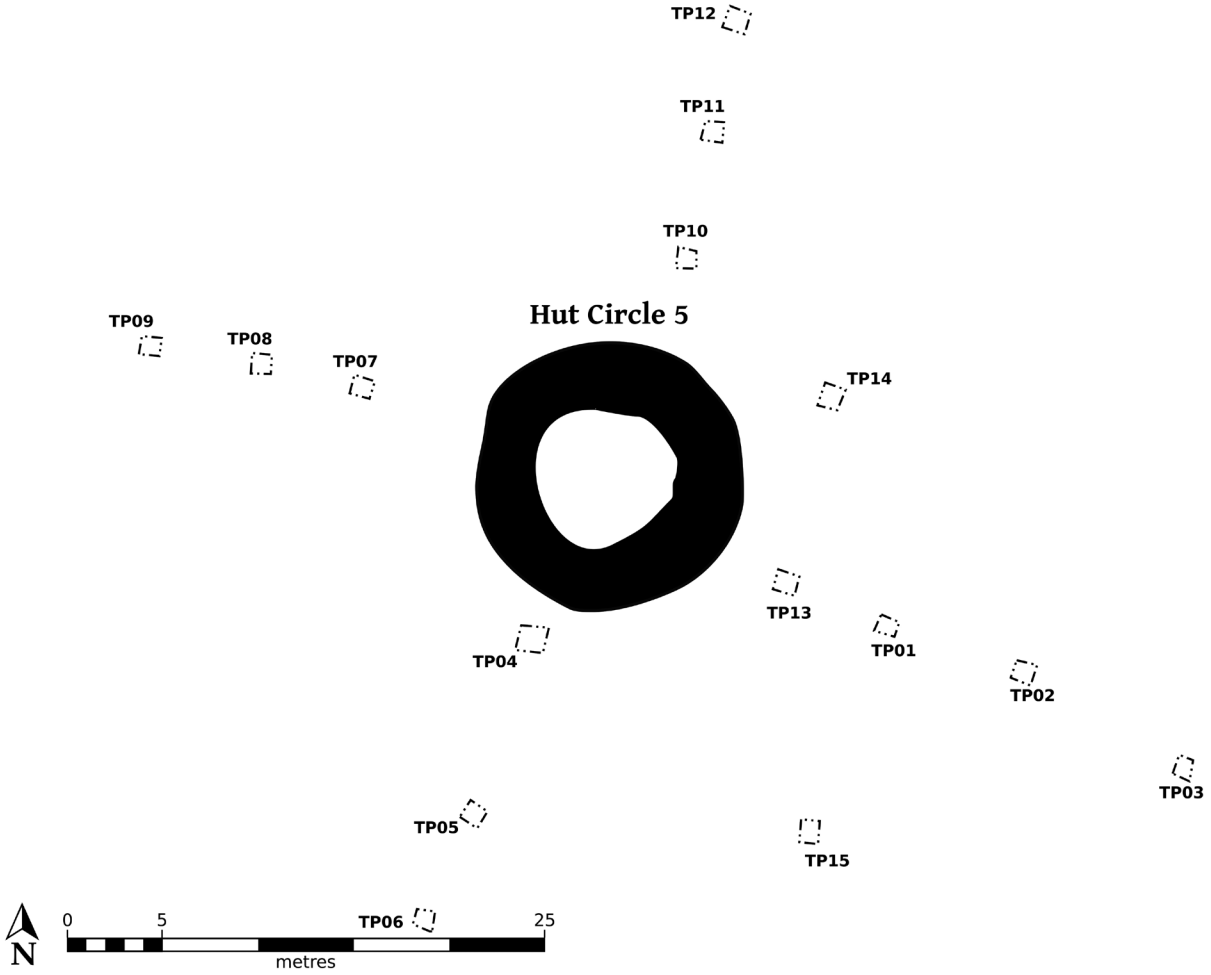


Figure 15: Distribution of test-pits around Hut Circle 5.

Hut Circle 13 *(Figures 3, 4 and 16, Plates 31 and 32)*

Hut Circle 13 measured approximately 16 m by 15 m externally, survived up to 1 m high, and had a possible entrance to the south-east, marked by a depression in the bank (Figure 16, Plate 31). The primary phase of construction was a substantial stone revetted bank comprising two sets of edge-set stones (112 and 113), enclosing a 0.6 m wide earth and stone core (111). The internal area of the hut circle was roughly oval and is estimated to measure c. 12.5 m by 9 m. The bank was constructed directly onto the surface of the stripped subsoil. Within the roundhouse and associated with this phase was a possible ring ditch (116), a shallow depression in the northern half of the structure subsequently filled with rough paving 115 (Plate 31). This paving lay under debris (110 and 105), from the collapse of the primary wall (similar to Hut Circle 5). A small assemblage of charcoal was recovered from the earthen fill of the interstices between paving 117. Three radiocarbon dates were obtained from fragments of alder or hazel charcoal which, when calibrated, were statistically indistinguishable at 1610–1420 cal BC (SUERC-9498, 3230 ± 35 BP), 1630–1450 cal BC (SUERC-9502, 3265 ± 35 BP) and 1630–1450 cal BC (SUERC-9503, 3270 ± 35 BP).

The collapse of the primary bank marks the end of the first phase. The stone facing and bank material (105 and 110) slumped into the centre of the roundhouse and the second bank was built on top of it (Plate 32). This second bank was less substantial and comprised a single course of stones (106), revetting the collapsed bank material. The collapsed material contained two worked stones, and it is assumed that these were redeposited from the first phase. The construction of the second bank had the effect of reducing the internal area to around 10.5 m by 7.5 m, and raising the floor level around the structure's edge. The collapsed bank core was riddled with rabbit burrows and had been effectively destroyed (Plate 32).

Plate 32: View of secondary bank and animal damage Hut Circle 13, from south west.

Plate 31: Hut Circle 13 showing paving and primary bank, from south west.

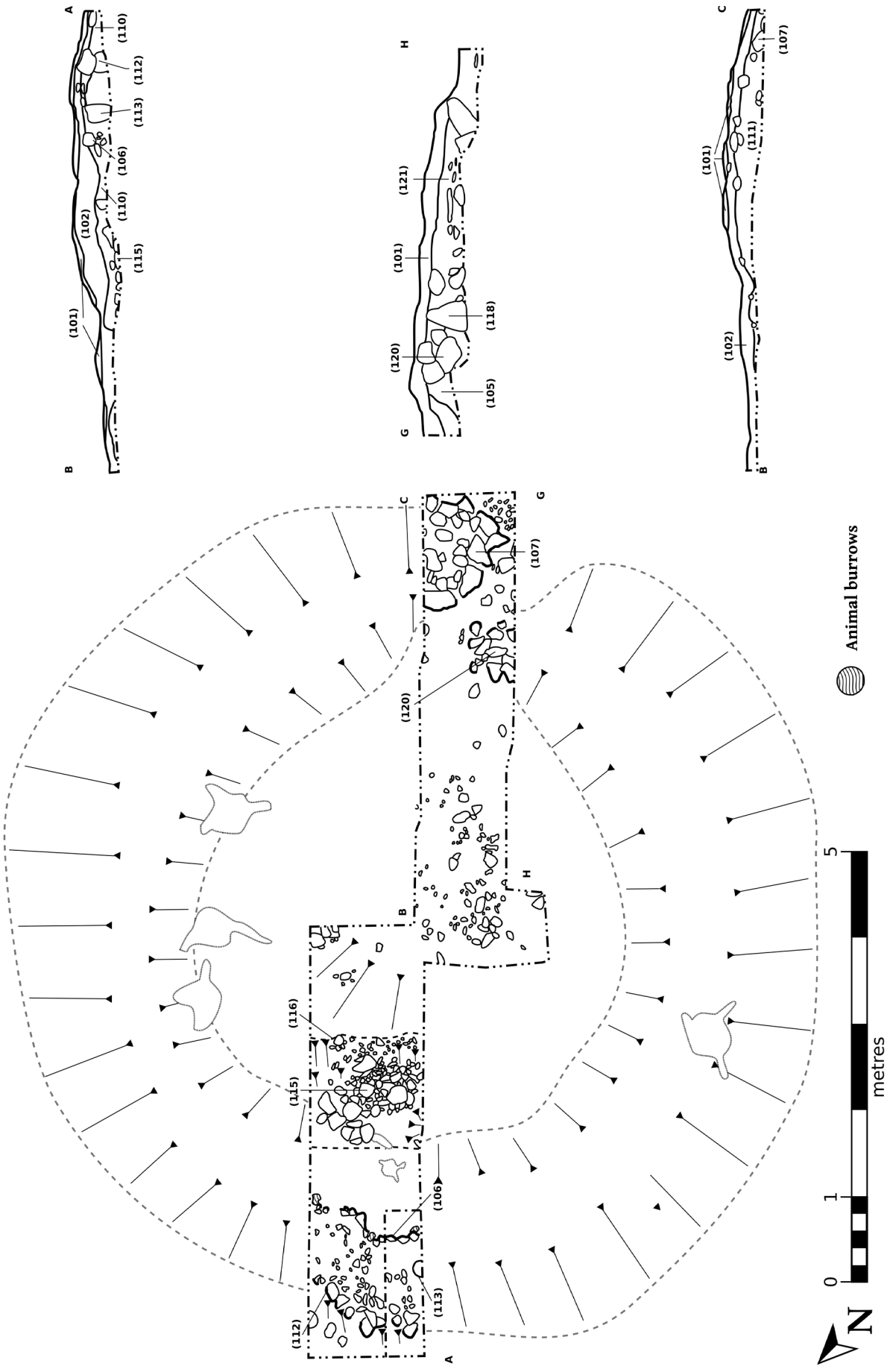


Figure 16: Plan and section of Hut Circle 13.

A total of 26 worked lithics, four coarse stone tools and an assemblage of MBA/LBA pottery body sherds (see *Lithics and course stone tools*) were recovered from the roundhouse. The bulk of this material was recovered from the centre of the structure and the fill of interstices between the paving, and it is assumed that these are contemporary with its use.

Analysis

Hut Circle 13 is a domestic structure with activity dating to its first phase, between 1630–1420 cal BC, with at least two phases of construction, the second of which would not normally have been observed on a plough-truncated structure. The primary phase comprised a formal faced wall. The pottery from the structure appears to relate to the final use of the primary structure prior to its immediate abandonment. It is likely that some of the lithics were associated with the use of the structure and some were residual. However, it is not clear if the second phase of construction is also domestic as it was slight, and it could for example have been a stock enclosure.

Hut Circle 14 *(Figures 3, 4 and 17, Plate 33)*

Hut Circle 14 measured 11.52 m externally, its bank survived up to 0.4 m high and there was a possible entrance to the south (Figure 17). The internal diameter was 8 m. The bank of the hut circle consisted of a stone wall. To the north, the wall comprised a well-built inner face two courses high and 0.8 m wide, and a less carefully built outer face one course high with an earth and stone core. The wall was more substantial on the southern side where it was 1.20 m wide and comprised faces up to two courses high with a stone core (Plate 33). The inside edge of the southern wall appeared to have been revetted with a line of small stones. The interior of the roundhouse had been so heavily truncated by rabbits that up to 0.2 m of material (201) had been completely homogenized with the effect that the roundhouse wall and its rough paving (205) appeared to 'float' within the site stratigraphy. Only one artefact, a coarse chopping tool (Rob Engl pers. comm.), was recovered from the structure.

Analysis

Hut Circle 14 appears to be a domestic structure, containing both a formal faced wall and internal paving. There was no indication of internal wear patterns on the floor and no indication of the structure's date.

Plate 33: Both faces of Hut Circle 14, looking north west.

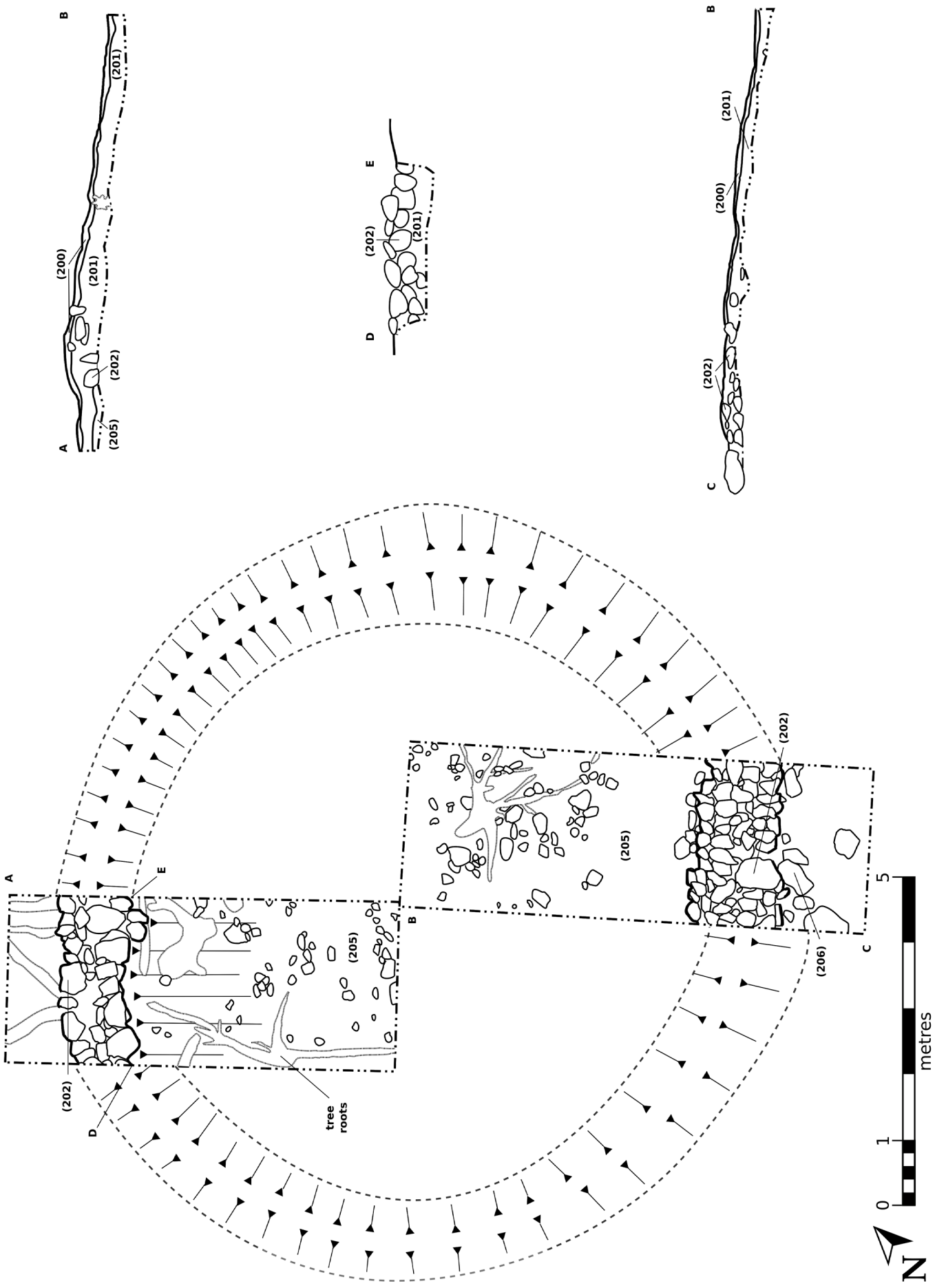


Figure 17: Plan and section Hut Circle 14.

Hut Circle 17 *(Figures 3, 4, 18 and 19, Plates 34-36)*

The internal diameter of Hut Circle 17 measured 12 m and the external diameter was 18 m, with no visible entrance. The boundary of the hut circle comprised a stony bank up to 1.2 m wide and 0.4 m high (302=403) with a single phase of construction (Figure 18, Plates 34-36). The structure's interior comprised the exposed natural subsoil (308=407) in the eastern two thirds of the structure and exposed bedrock (404) surrounded by tightly packed cobbling (405 and 406) in the western third of the interior (Plate 34), seen in Trench 4. 405 appears to represent the fill of 408, an erosional feature, while 406 may represent structural makeup, as the underlying natural surface drops at this point. Alder or hazel charcoal from 405 gave a date range of 1513–1414 cal BC (SUERC-36872, 3190 ± 30 BP). While the interior in Trench 3 had been severely impacted by tree roots, a thin charcoal layer (303), two pits (305/306 and 309/310) and an area of burning (308) survived. Beyond the outer edge of the hut's circular bank, lay deposits of stone clearance material (301=403).

Plate 35: View showing external bank and interior Hut Circle 17, looking north east.

Plate 34: View of the interior of Hut Circle 17 and showing bedrock, looking south west.

Plate 36: View of interior of Hut Circle 17, looking south west.

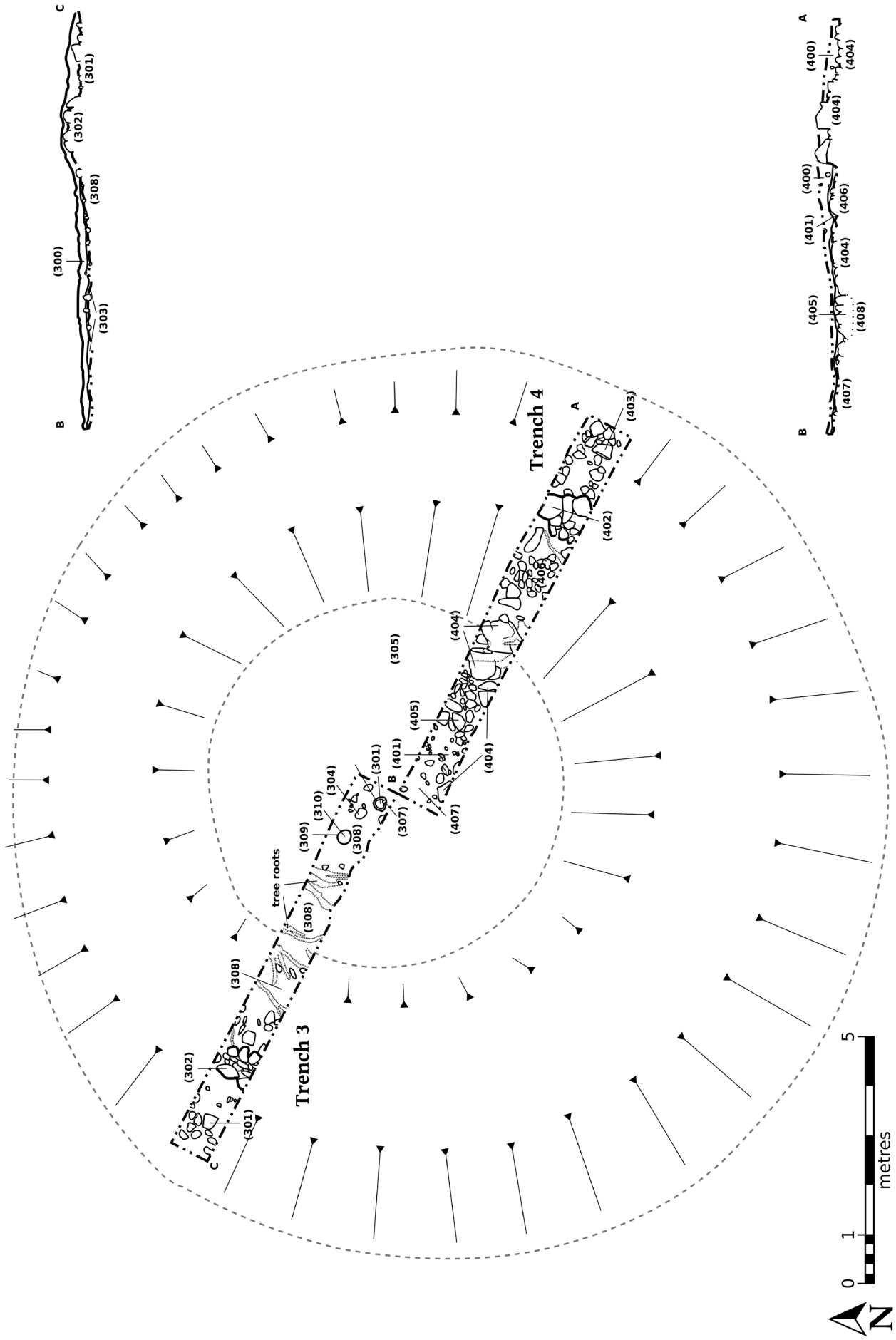


Figure 18: Plan and Section Hut Circle 17.

While no pottery was found within from Hut Circle 17, there was an assemblage of lithics recovered from both the structure's interior and its immediate environs, although none was diagnostic. Six lithics came from the structure and 32 from around it. Thirteen test pits were excavated (Figure 19) and of these only seven produced lithics, which were concentrated to the south-east of the hut circle. TP 103 contained a charcoal-rich cut or posthole (10306), which remained unexcavated. Birch charcoal from the surface of 10306 gave a date range of 1513–1414 cal BC (SUERC-36870, 3190 ± 30 BP). This raises the possibility of an earlier, now truncated, structure at this location. Another possibility, given that the lithic analysis (see *Lithics and coarse stone tools*) identified a different processing technique at this location, is that this was an external lithic processing area, as the date is statistically indistinguishable from that recovered from the interior.

Lawrence's chemical analysis (see *Soil chemistry*) indicated that the south-west quadrant of the structure may have been a sleeping area, while non-fire food preparation could have taken place in the west and south-west portions.

Analysis

Hut Circle 17 is assumed to be a domestic structure, with associated charcoal dating to between 1513–1414 cal BC, with only one phase detected. There was no formal wall to the structure, merely a bank and the majority of lithics are probably residual. A contemporary date was recovered from uncertain activity to the south-east of the hut circle in the vicinity of a possible lithic scatter, which is presently undated but perhaps may be contemporary with the hut circle.

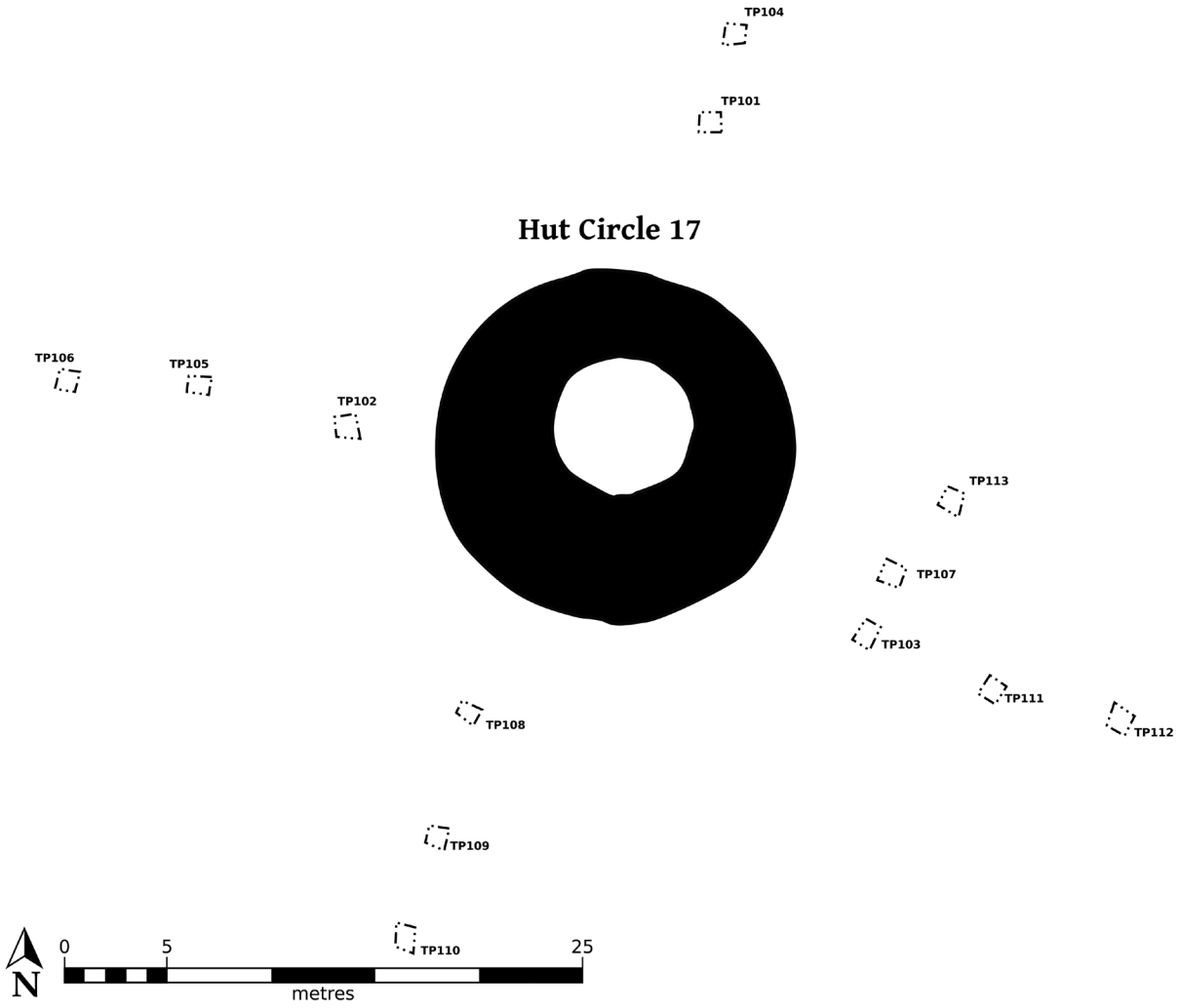


Figure 19: Test pits Hut Circle 17.

Hut Circle 18 *(Figures 3, 4, 20 and 21, Plates 37 and 38)*

Hut Circle 18 had an external diameter of 10-11 m and an internal diameter of 6.5 m and was excavated by two trenches (9 and 10) orientated N/S (Figure 20). The survey (Figure 3) identified a slight dip in the bank in the south-east, which could potentially be an entrance, although this unlikely given its size. Hut Circle 18's stone-rich bank (902) was excavated in Trench 9 and comprised rounded to sub-rounded stones, with kerbs to both the inner and outer faces (903 and 904). Overall, the bank measured 1.3 m wide and was 0.6 m high. It is possible that the kerbs represent a secondary phase of construction (Plate 37). To the exterior of 902 lay 906, a series of small stones representing collapse from 902, which lay on top of mid-brown soil up to 0.1 m thick, and likely to be a buried topsoil (910). In turn, 910 lay upon the natural orange subsoil (909). To the interior of 902 lay a series of small stones (908), representing collapse from 902, and which lay directly on 909. In contrast, the bank (1002) in Trench 10 comprised a concentration of sub-rounded stones on average 0.21 m by 0.46 m by 0.1 m and was heavily bioturbated (Plate 38). Overall, the bank measured 1.1 m wide and 0.44 m high, though it had no real structure and appeared to have been impacted by forestry operations. Birch charcoal from 902 gave a date range of 1607–1434 cal BC (SUERC-49519, 3235 ± 29 BP). 907, which lay under 902 and 906, comprised dark brown charcoal-rich soil which was up to 0.2 m thick and appeared to be buried topsoil. Alder charcoal from 907 gave a similar date range of 1608–1440 cal BC (SUERC-49520, 3241 ± 29 BP).

Within the interior of the structure, was mid-brown organic-rich and highly bioturbated soil (1005=905) with numerous charcoal inclusions, measuring up to 0.22 m thick and lying directly on the underlying natural subsoil (1007). 1005 contained pottery SFs 17 and 19, which comprised a Neolithic rim and body sherd of an Impressed Ware bowl and an undiagnostic body sherd (see *Prehistoric pottery*). Within 1005 lay a series of concentrations of charcoal (1004, 1008, 1009 and 1010) all of which contained uncarbonised elements, and which appeared to derive from a recent bonfire which had been mixed into the soil by the action of the forest plough. At the southern end of the trench were two sub-angular stones, only partially exposed, these appeared to form a stone setting (1003) of unknown function, but perhaps packing for a post at least 0.6 m in diameter.

Plate 37: Hut Circle 18 initial cleaning, from south.

Plate 38: Hut Circle 18 section through Trench 10 after excavation, from west.

A total of 22 lithics were recovered from within the hut circle and 42 from test pits around it (Figure 21). As discussed above, it is likely that Hut Circle 18 was built in the vicinity of an earlier Mesolithic/Neolithic lithic scatter. In addition, fragments of seven Neolithic vessels weighing 163 g were recovered from the bank (902) and the internal deposits (1001, 1002 and 1005). The majority (97g) came from Vessel 1 from the bank (902) (see *Prehistoric pottery*).

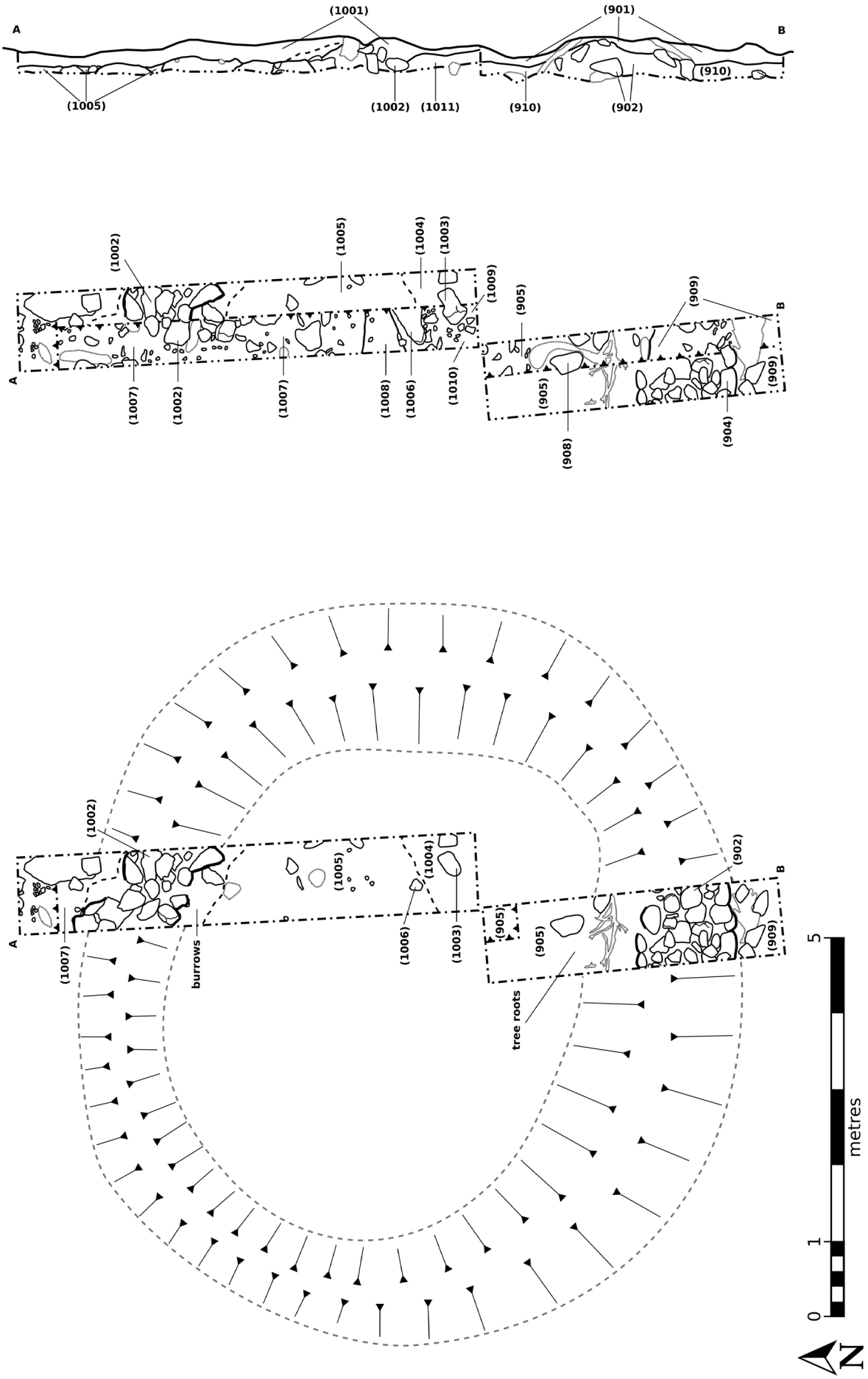


Figure 20: Plan and Section of Hut Circle 18, Trench 10 (lower) and Trench 11 (upper).

Analysis

Hut Circle 18 appears to have been built upon a MBA cultivated soil, which had formed on a Neolithic site. The presence of MBA charcoal and Neolithic pottery in its bank suggests that this material was present in the immediate locale and perhaps quarried for construction. It seems unlikely Hut Circle 18 was a domestic structure in the absence of indicators of dwelling activities. The presence of the stone setting at its core, combined with the deeper internal soil and the inner and outer bank kerbing may suggest a different function, perhaps a form of ring cairn, although no human remains were recovered. Indeed, the scale and nature of the banks and kerbs is in keeping with the broader data of ring cairns from Aberdeenshire (Kenworthy 1973, Figure 2, Ritchie and MacLaren 1973). This raises the possibility that an earlier Neolithic structure may in fact have been memorialised or aggrandised rather than simply being accidently included as building material.

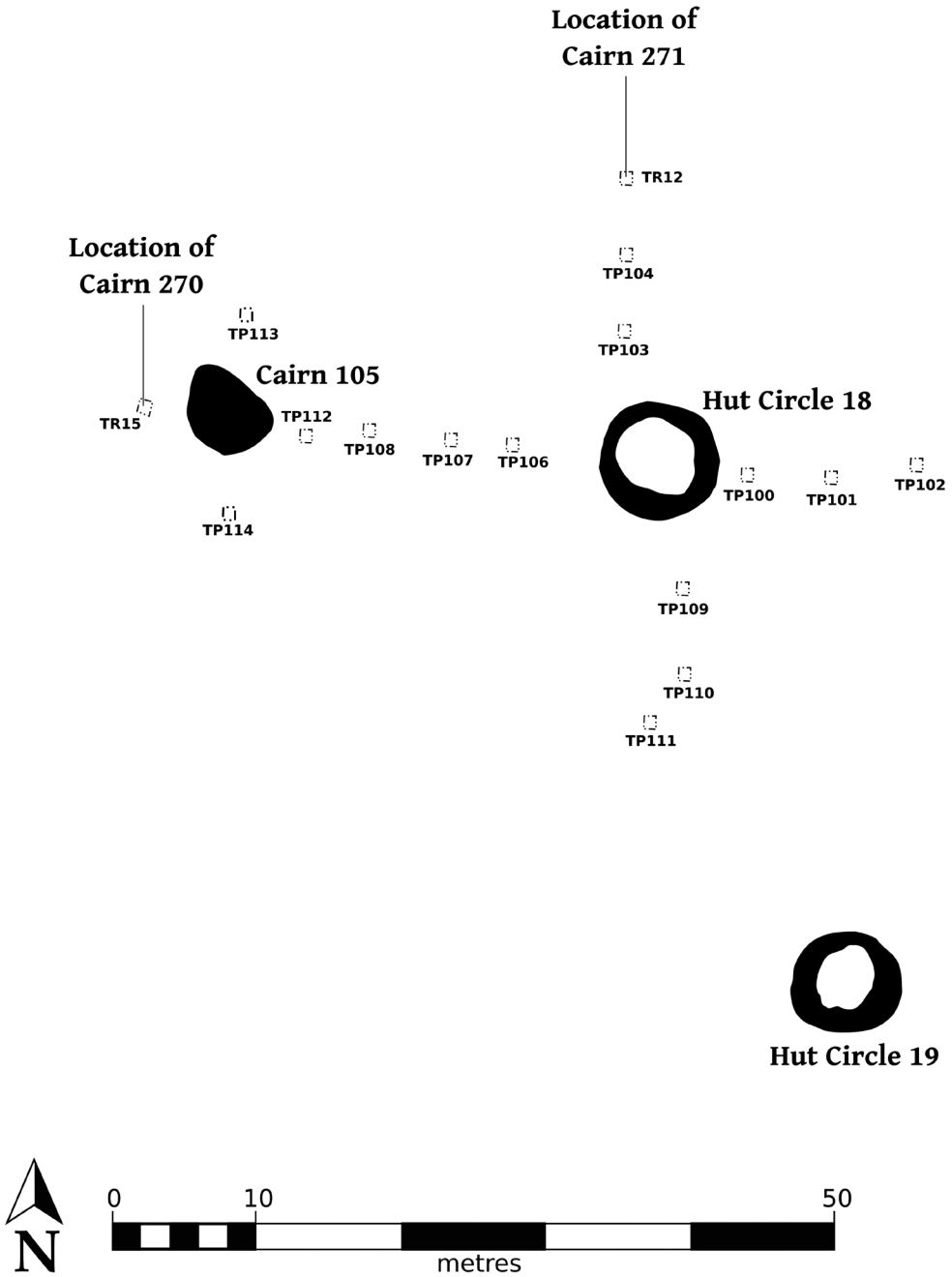


Figure 21: Distribution of test-pits around Hut Circle 18.

Hut Circle 19 *(Figures 3, 4, 22 and 23, Plates 39-43)*

Hut Circle 19 had an external diameter of 11.5 m and an internal diameter of 7 m and was sampled by two trenches (7 and 8) on a N/S axis (Figure 22). The hut circle comprised a low stony bank (702=802), which measured up to 2.6 m wide and up to 0.3 m high with up to two courses. The bank appeared to have been flattened by forest traffic (Plates 39, 40, 41 and 42).

Plate 39: Hut Circle 19 Trench 7 initial clean, from west.

Plate 40: Hut Circle 19 Trench 8 initial clean, from east.

There were two cut features within the trenches (705/706 and 805/806), which both appear to have been postholes (Figure 22). There was no lining or paving in the interior, though the underlying natural (703=803) contained numerous flecks of charcoal. Alder charcoal from 703 gave a date range of 1368-1091 cal BC (SUERC-429940, 2975 ± 29 BP). Alder charcoal from 803 gave an earlier date range of 1491-1316 cal BC (SUERC-42990, 3127 ± 27 BP).

Plate 41: Hut Circle 19 Trench 8 stone setting, from west.

Plate 42: Hut Circle 19 Trench 8 after excavation, from south.

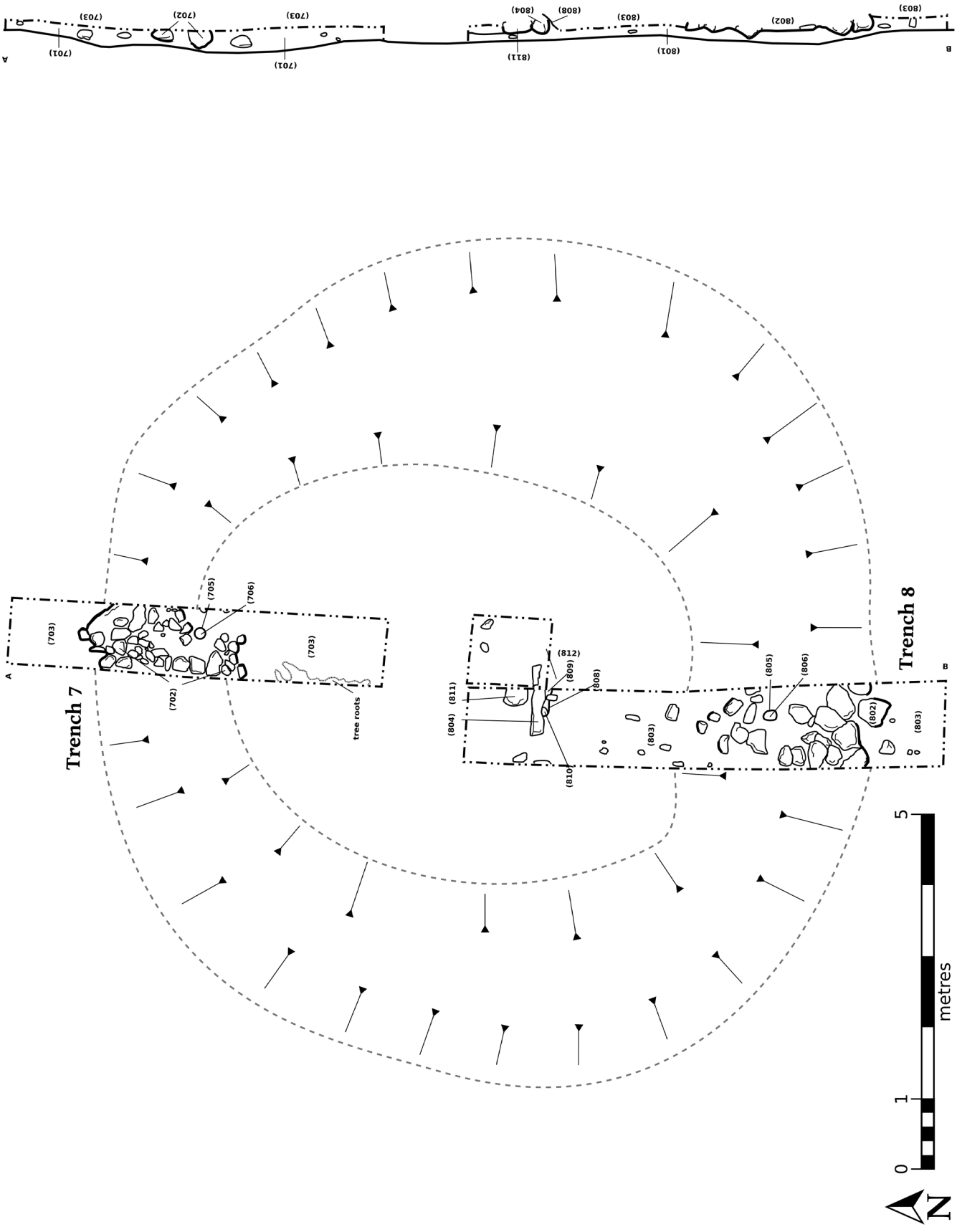


Figure 22: Plan and section of Hut Circle 19.

At the northern end of Trench 8 was a single edge-stone (804), orientated E/W and measuring 0.22 m wide and at least 0.6 m long, extended into the trench section (Figure 22). 804 had two substantial packing stones to its north (811) and east (812) (Plate 43), the latter was identified in a 1 m by 1 m extension to the east. In addition, 804 lay in a cut 808, the fill of which 809 contained a piece of pottery which may be Neolithic in origin (see *Prehistoric pottery*), but could equally be residual. The function of the stone setting was unclear. However, there was no obvious evidence that it was a hearth, and perhaps it may be viewed as packing stone for a timber post, though there was no indication of a posthole.

Plate 43: Hut Circle 19 Trench 7 after excavation, from north.

Lawrence's chemical analysis (see *Soil chemistry*) indicated the presence of human activity but different from that of Hut Circles 17 and 28. She suggested that there was more than one possible hearth location in the structure and that the chemical signals may not be connected to food preparation. All of which may indicate a non-domestic function.

Three pieces of lithic debitage were recovered from the interior of Hut Circle 19, and 18 lithics from test pits around it (Figure 23) and it seems more likely, given the nature of the assemblage, that the lithics are residual rather than in situ.

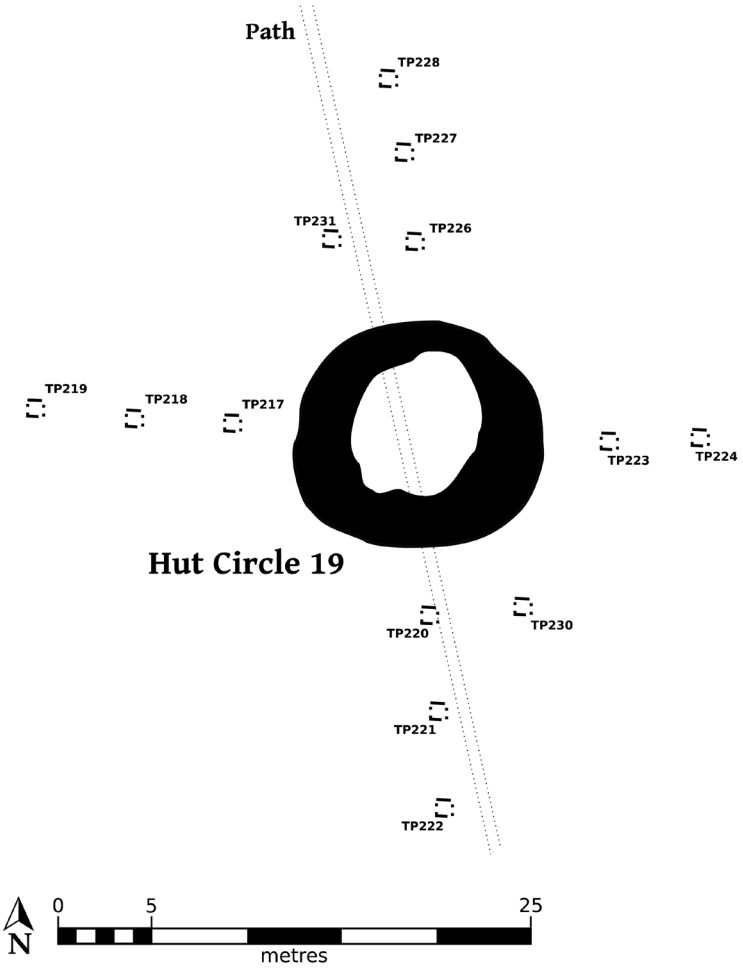


Figure 23: Distribution of test-pits around Hut Circle 19.

Analysis

It is not clear whether Hut Circle 19 is a domestic structure. The presence of the substantial stone setting at its core, which did not appear to be a hearth, combined with both the insubstantial bank and the broad chronological range of radiocarbon dating (1491–1316 cal BC and 1368–1091 cal BC), as well as the potentially Neolithic pottery at its core, perhaps tentatively suggest some form of ritual structure. It should be noted that the radiocarbon dates do not date the structure's construction and whilst they may be connected to its use, both may be dates from residual material. Potentially, the bank and the date range suggest a parallel with enclosing works surrounding the enclosed flat cremation cemeteries discussed by Ritchie and MacLaren (1973, 14-15), although no human remains were recovered. However, as the soils were peaty and acidic, it is not clear that unburnt bone would have survived.

Hut Circle 28 *(Figures 3, 4, 24 and 25, Plates 44-47)*

Hut Circle 28 has an external diameter of 9 m and an internal diameter of 4 m, with no visible entrance and was explored by two trenches (5 and 6) (Figure 24). The western bank in Trench 5 appears to have had two phases, which is represented by a widening of the bank, and this was also identified in Trench 6. The primary phase comprised a stone-faced bank, some 1.52 m wide, with a soil interior heavily bioturbated (Plates 44 and 45). The inner and primary bank (509) was not fully excavated due to the size of the possible secondary bank (502), but comprised a kerb of three sub-rounded stones. 502 had no formal structure and merely comprised a dump of rounded and sub-rounded stones up to 0.4 m high, with dark brown sandy soil. The stones used in 502 were substantial and measured up to 0.5 m by 0.6 m by 0.3 m and there was a clear kerb to the exterior of the bank. The construction of 502 reduced the internal diameter of the hut circle by 0.6 m. It may be that the action of the forest plough impacted on a putative inner face to the secondary bank, the equivalent of which was identified in Trench 6 (613).

Plate 44: Hut Circle 28 Trench 5 under excavation, looking west.

Plate 45: Hut Circle 28 Trench 5 after excavation, looking east.

The eastern bank in Trench 6 clearly had two phases (Plates 46 and 47). The secondary bank measured 1.6 m wide and up to 0.3 m high and appeared to simply comprise the addition of two new kerbs, 613 to the interior and 614 to the exterior to the original bank (602). The original bank (602) comprised a dump of sub-rounded stone 0.8 m wide, with a soil core and an inner kerb. However, it had been heavily undermined by animal burrows and collapsed during the excavation, so it was not possible to determine the precise relationships between the kerbs and phases of the banks. The insertion of the inner kerb (614) reduced the size of the interior of hut circle by up to 0.4 m.

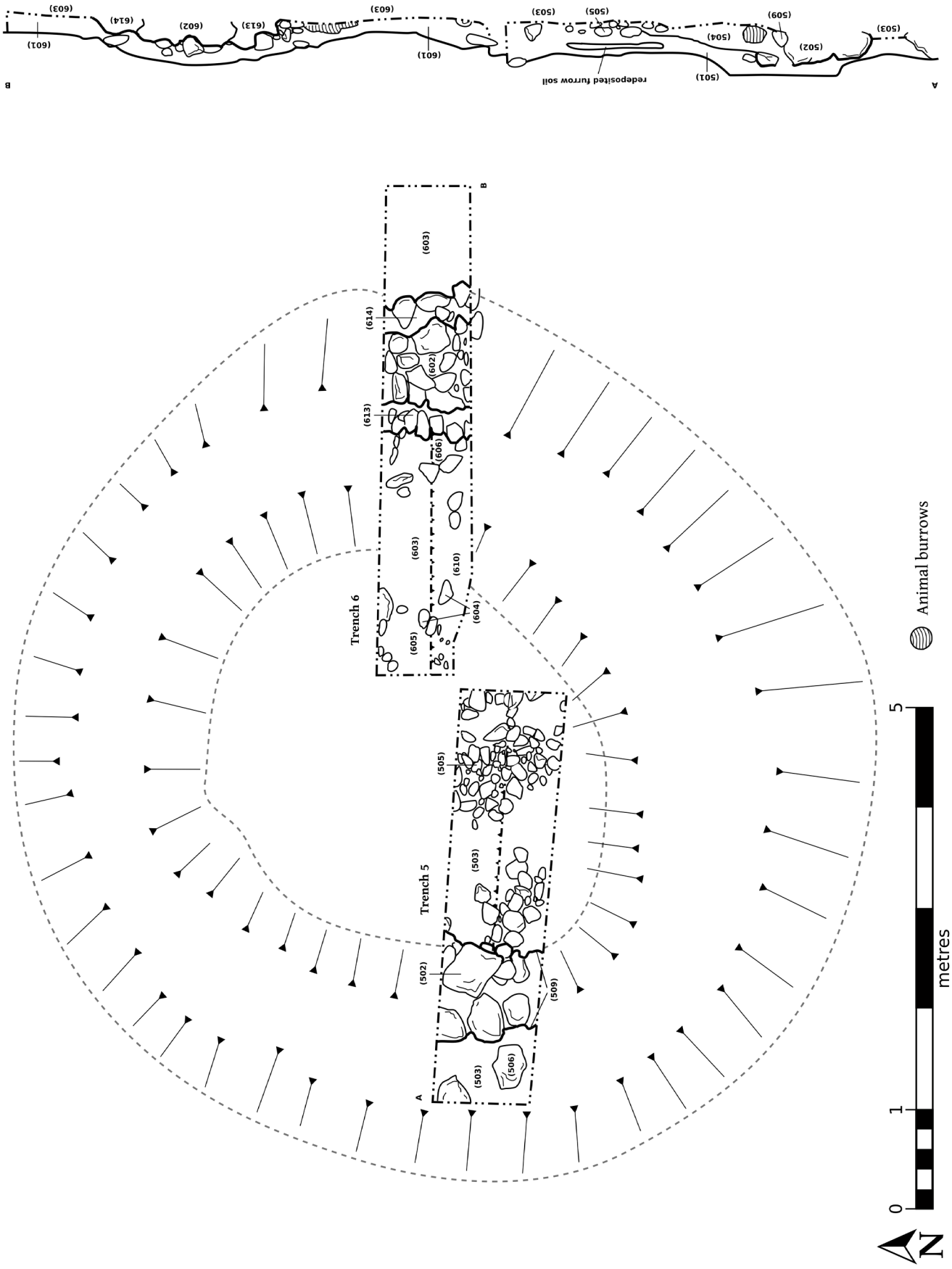


Figure 24: Plan and section of Hut Circle 28.

Plate 46: Hut Circle 28 Trench 6 under excavation, looking east.

Plate 47: Hut Circle 28Trench 6 after excavation, looking east.

The collapse from 509 and 504, comprised black orange, charcoal-rich soil, with a layer of iron pan at its upper surface, up to 0.3 m thick (Figure 24). 504 overlay the western edge of 505, an area of rough cobbling lying in a possible erosional hollow or possible ring ditch (507), which measured 1.7 m wide and up to 0.15 m thick. Alder charcoal from 505 gave a date range of 1626-1496 cal BC (SUERC-42988, 3281 ± 27 BP). 507 cut into the underlying natural subsoil (503). Beyond Hut Circle 28, on the west side, lay some large single stones (506), which appeared to derive from stone clearance.

The interior of Hut Circle 28 had been heavily affected by burrowing animals and around 0.1 m was homogenous, leaving features 'floating'. There were at least two pits or postholes (606/607 and 610/612) within Trench 6. The former was circular measuring 0.25 m in diameter and 0.4 m in depth, with vertical sides and a flat base (Figure 24). The sides of the posthole were lined with packing stones. The fill of 607, 606 was dark brown homogenous organic-rich soil. The second feature (610/612) was unexcavated. Both features were cut into the underlining natural subsoil (603), which was full of charcoal deriving from internal activity. Birch charcoal from this context gave a date range of 1504–1413 cal BC (SUERC-42989, 3186 ± 27 BP).

At the western edge of Trench 6 was a collection of loose sub-rounded stones (604), possibly representing cobbling of the interior, but they had clearly been impacted by the action of forest ploughing. At the north-west corner of Trench 6 was an area of scorched natural (605), which appeared to represent where a hearth may have been present, the rest of which lay under the baulk and a tree.Lawrence's chemical analysis (see *Soil chemistry*) indicated that the west and northern sections could have been associated with non-fire food preparation, although of course the possible hearth was in the north-west quadrant.

No pottery was recovered from Hut Circle 28. However, seven lithics were recovered from its interior and 54 from test pits around it (Figure 25). As indicated above, Hut Circle 28 appears to have been built in the vicinity of a Mesolithic/ Neolithic lithic scatter and it is not clear how many of the lithics are residual.

Analysis

The presence of a possible ring ditch 507 and hearth in the hut circle may suggest a domestic function. However, it is argued that the internal area is simply too small to have functioned as a dwelling, although it may have functioned as a workshop. In addition, the putative secondary phase at the site is paralleled at Hut Circle 18, which was also argued to be non-domestic and perhaps some form of ring cairn. Also, like Hut Circle 18, Hut Circle 28 is in keeping with the broader forms and scale of ring cairns in Aberdeenshire (Kenworthy 1973, Figure 2, Ritchie and MacLaren 1973), although no human remains were recovered.

The structure and its use dates to between 1626–1496 cal BC and 1504–1413 cal BC, dates which only just overlap and may reflect an extended use.

The structure was built in the vicinity of a Mesolithic/Neolithic lithic scatter and clearly some of the lithics within its interior are residual. The structure appears to have had two phases, the second of which restricted the internal diameter by 1 m.

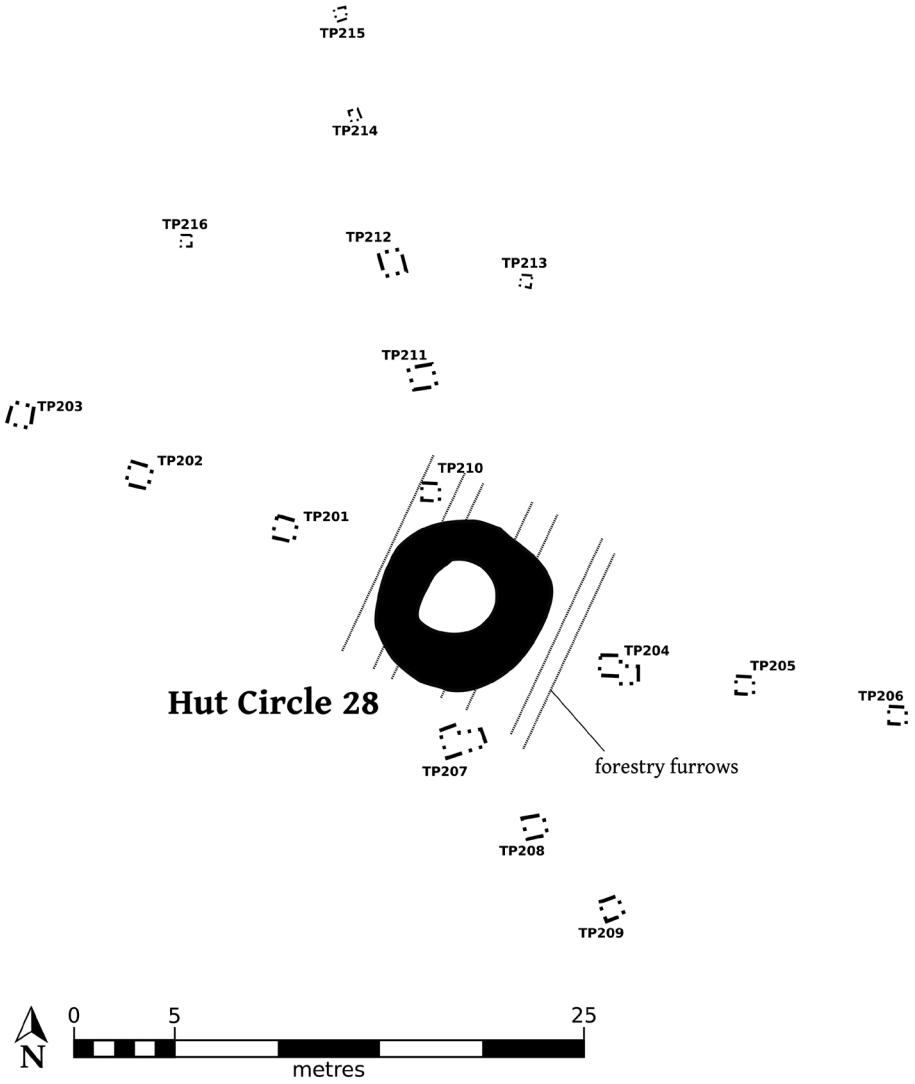


Figure 25: Distribution of test-pits around Hut Circle 28.

Hut Circle 29 *(Figures 3, 4, 26 and 27, Plates 48-50)*

Hut Circle 29 had an external diameter of 12 m and an internal diameter of 8.75 m, although only the eastern arc of the bank survived. It was sampled by two trenches (20 and 21) orientated roughly E/W (Figure 26). The bank (2002) survived in Trench 20 and measured 1.73 m wide and 0.32 m high, although it had no obvious structure and was made of sub-rounded stones on average 0.2 m by 0.1 m by 0.15 m (Plate 48). Under 2002 lay two features: a buried soil (2004) some 0.11 m thick and an earlier kerb (2008), which abuts 2004. 2008 comprised a single line of sub-angular stones within a cut (2009) with a fill of mid-brown soil (2010) (Plate 49). This inner kerb may have been a primary phase of the structure's construction. To the interior of the bank was a disturbed layer (2003), which appeared to be the interface between the underlying natural (2013), and the occupation surface of the hut circle. Birch charcoal from 2003 gave a date range of 1585–1535 cal BC (SUERC 57511, 3321 ± 28 BP). Nine worked lithics, including a lithic core (SF 2014-007a), were recovered from 2003. A possible pit (2011/2012) was cut into 2013, although it remained unexcavated. A second possible pit (2006/2007) was found to be an animal burrow.

Plate 48: Hut Circle 29 Trench 20 initial cleaning, looking east.

Within Trench 21, the main feature was a loose spread of sub-rounded stones (2102) measuring on average 0.1 m by 0.15 m by 0.2 m and extending over 3.55 m, which appeared to be the remains of the hut circle's bank (Plate 50). 2102 lay over 2104, a possible buried soil measuring 0.05 m. The other feature was a possible erosional hollow or ring ditch (2105), which was filled with 2103 and measured 1.39 m wide and 0.15 m deep, with an even base. Birch charcoal from 2103 provided a date range of 1611–1531 cal BC (SUERC 57510, 3288 ± 28 BP). The interior 'floor surface' of the hut circle (2108) comprised a dirty orange bioturbated surface which appeared to be the interface between the human occupation and natural subsoil (2109) (Figure 26). A heavily bioturbated pit (2106/2107) was identified in the hut circle's interior, but was not excavated.

Plate 49: Hut Circle 29 Trench 21 initial cleaning, looking north-east.

While no pottery was recovered, a total of 11 lithics were recovered from the interior of the hut circle and 23 from the test pits around it (Figure 27). The material included both tools and debitage and ranged in date from the late Mesolithic/early Neolithic to the Neolithic/EBA. It is not clear how much material was in situ within the hut circle, but certainly some material is residual and it is likely that Hut Circle 29 was built within the environs of an older lithic scatter.

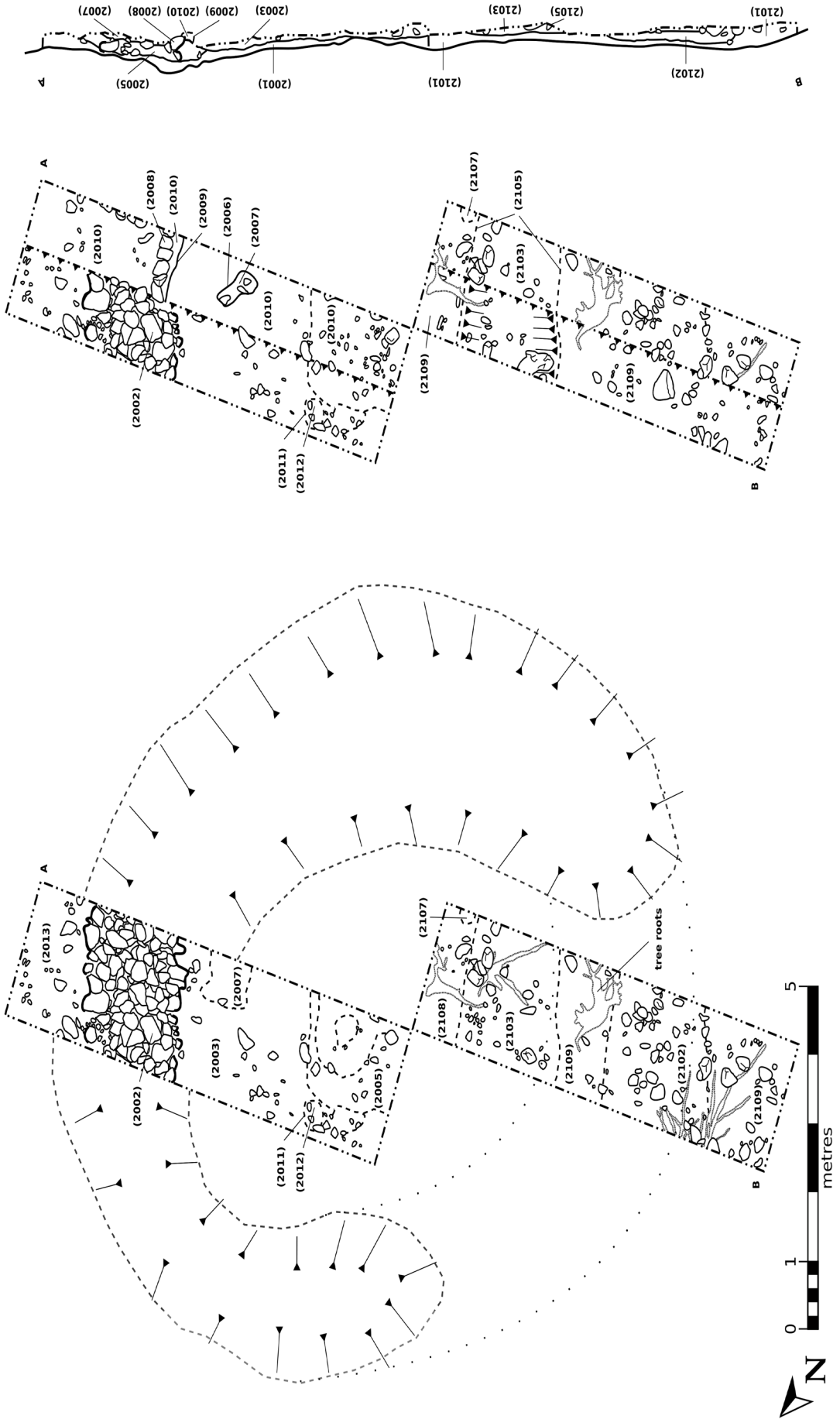


Figure 26: Plan and Section of Hut Circle 29, Trench 20 (top) and Trench 21 (bottom).

Plate 50: Hut Circle 29 Trench 20 after excavation, looking west.

Analysis

Hut Circle 29 appears to be a truncated domestic structure with some activity dating to 1611–1531 cal BC, with perhaps two phases, although it is not clear which phase the absolute dates belong to. The secondary phase was clearly only constructed following the demolition of the primary phase. The structure was built in the vicinity of a Mesolithic/Neolithic lithic scatter and clearly some of the lithics within its interior are residual.

Hut Circle variables

Of the 27 hut circles eight were sampled, seven of which were dated to the MBA and one was undated (Table 2). Three structures above were argued to be non-domestic (Hut Circles 18, 19 and 28). Extrapolating this data this might suggest around 10 of the 27 structures are non-domestic and that the remaining 17 are likely to be domestic and MBA in date. Based on the survey (Figure 4) it is proposed that Hut Circles 8 and 26 are similar in nature to Hut Circles 18 and 28 and thus also potentially ring cairn variants. The distribution of domestic hut circles is focused on the north-east of the site, while non-domestic structures are clustered to the south-west, although these latter structures are also focused on or close by to a break in tree planting so their apparent clustering may be simply based on survival and recognition. While there is no absolute evidence for post-MBA structures, both Hut Circles 5 and 13 have secondary phases which were constructed in the collapsed ruins of their primary phases.

The presence of MBA charcoal under MBA structures (Hut Circles 5 and 18) is assumed to reflect the spread of domestic refuse as middening. That the dates are statistically indistinguishable suggests that they were constructed in amongst active farmland and

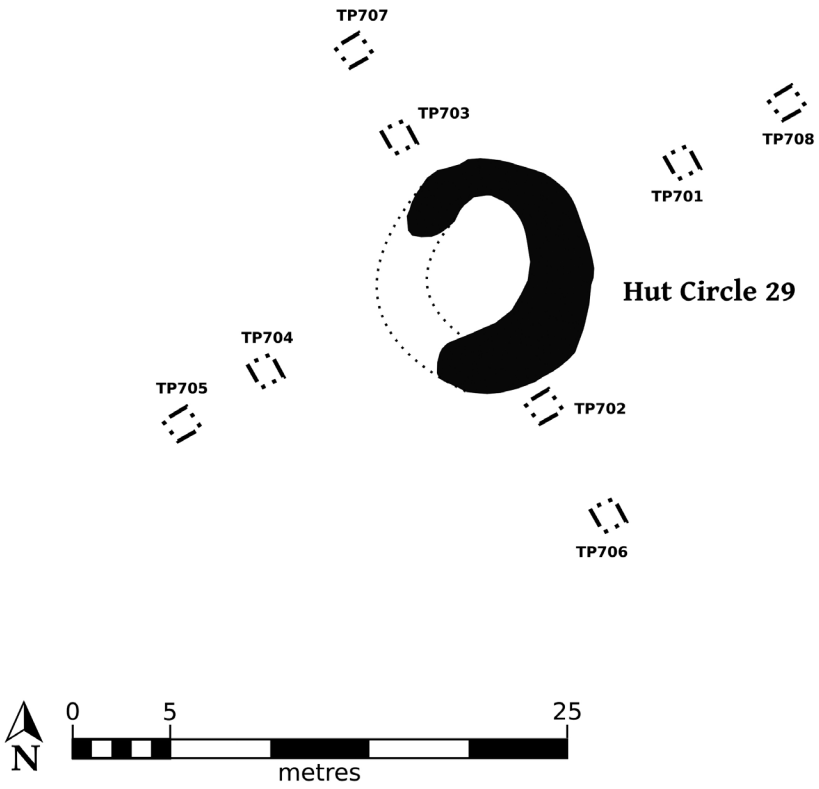


Figure 27: Distribution of test-pits around Hut Circle 29.

perhaps even over former tilled plots. At present there was no evidence for the subsequent prehistoric ploughing-out of upstanding hut circles, which may suggest they were respected by later ploughing. However, this may simply be a product of the nature of the project and its focus on upstanding features.

Amongst the hut circles assumed to be domestic there was a range of internal diameters, from 11.5 m (Hut Circle 14) to 18 m (Hut Circle 17), which is within the average range of contemporary structures (Pope 2015, 117). Where entrances were identified they tended to focus on the south (none faced north) which is in keeping with the general interpretation that door orientation was aimed at maximising light in the interior (Pope 2007).

All of the sampled domestic structures had ring ditches present, which is considered to reflect internal use rather than any form of architecture (Cook and Dunbar 2008, 12-13, Harding 2009, 76-81). There were very few objects in the interiors of the structures and no evidence for conflagration, though less than 20% of the interior of each structure was exposed. There was some possible evidence for lithic working outside one structure (Hut Circle 17), though of course such material could be residual.

There were two differing types of bank: a dump of material (Hut Circles 17 and 29) and a kerbed low wall (Hut Circles 5, 13 14 and primary phase of 29). Interestingly, the two differing examples of wall architecture appear to occur in clusters (Figure 4).

The secondary phases of Hut Circles 5 and 13 (and the primary phase of Hut Circle 29) are similar in design, showing a slight kerb and presumably reflecting a less substantial structure as well as the pragmatic reuse of an already cleared house platform. However, aspects of why reuse takes place could also relate to inheritance rights or, of course, some attempt to connect with earlier communities. Elsewhere, Hut Circle 17 may have been built over an earlier, if broadly contemporary, structure. This topic will be considered in more detail in the *Discussion* (below).

It is tempting when considering Balbithan to propose a core of settlement with peripheral satellite locations (Figure 4). However, as argued above, the visible extent of hut circles and cairns is fragmentary, and it is likely that the structures were more extensive. However, it is worth remarking that while a newer structure may be superimposed on top of an older one, no two structures are closer than 20 m to one another. This will also be discussed further below.

Non-Domestic Hut Circles

As proposed above, five hut circles (Hut Circles 8, 18, 19, 26 and 28) are argued to be non-domestic based on their size. The most obvious non-roundhouse structures found in Aberdeenshire are ring cairns, and the proposed examples are within the range of so-called north-east Scottish ring cairns (Kenworthy 1973). However, none of them were associated with human remains, so any discussion must remain highly speculative. In addition, ring cairns are traditionally dated to the EBA (Rees 1997, 277) and the excavated structures have radiocarbon dates from the MBA and LBA. While it was earlier speculated that the smaller structures may have functioned as workshops, there is no evidence for this from similar excavated structures, so the author prefers the ring cairn theory.

However, it is clear that there is both considerable variation within the form (Kenworthy 1973, 20, Ralston and Sabine 2000, 155) and a much larger date range. Ralston and Sabine's excavation (2000, 155), within an assemblage of kerb cairns and ring cairns at the Sands of Forvie, recovered a *terminus ante quem* dating to 1740-1030 cal BC from a kerb cairn/ring cairn variant, which overlaps with the above dates. An even later example was identified at Laikenbuie, Auldearn (Scott and Jack 2016, location 2827) which was constructed on an old ground surface containing charcoal dating from 760-400 cal BC and 770-410 cal BC, indicating that the cairn was built after this date.

Clearly, the slight bank of Hut Circle 19 is probably not a ring cairn. Although its scale is in the right range and there is considerable variation within the existing data-set (Kenworthy 1973, 20, Ralston and Sabine 2000, 155), but it lacks a formal kerb (Table 2). Rather, the slight bank may echo the curving boundaries of flat cremation cemeteries like Loanhead of Daviot (Kilbride-Jones 1936), although there were no human remains.

Post-excavation research

Soil chemistry

By Joanna M. Lawrence[3]

Introduction

A total of 135 soil samples were collected from the Bronze Age floor levels of Hut Circles 17, 18, 19, and 28, and the levels of 11 trace elements (Al, Ba, Ca, Cu, Fe, K, Mg, Mn, P, Sr, and Zn) were analysed using Inductively Coupled Plasma Optical Emission Spectroscopy (ICP-OES). The goal was to characterise and compare the spatial patterning of activity areas within each structure.

Over time, human activities leave chemical residues in soils, plaster surfaces, and dirt floors that can be identified using soil analysis techniques (Barba and Lazos 2000, Middleton and Price 1996, Middleton *et al.* 2010, Wilson *et al.* 2005). In ideal conditions, such as the relatively undisturbed structures at Balbithan, these chemical signatures can reveal patterns of behaviour even when artefacts are absent.

While providing a wealth of data, ICP-OES analysis of trace elements presents several challenges in its applications to assessing human activity through soil residues. Studies comparing the results of such analyses with artefactual or historical evidence of spatial use show the relationships between human activities and soil chemistry to be various and complex, hence these results can be difficult to interpret (Middleton and Price 1996, Middleton *et al.* 2010, Wilson *et al.* 2005, Wilson *et al.* 2007). One-to-one correlations between activities and singular element's traces are elusive, but with signatures of multiple elements, relationships between activities and these signatures start to appear. However, due to variability in local geologic environments, studies of such signatures must relate signatures relatively to each other within a site, as absolute relationships of exact ratios of elements and specific activities are not possible between sites.

Nevertheless, these studies have identified general correspondences between groups of chemicals and human activities (ibid, Table 4). High levels of strontium (Sr), calcium (Ca), phosphorus (P), magnesium (Mg), barium (Ba), and sodium (Na) in sediment usually indicate areas of elevated human activities, especially those with potential to leave liquid residues. Sleeping areas and areas of high traffic are usually represented by low levels of these elements. Hearth areas (food preparation and fuel burning) usually contain the highest levels of these chemicals, and additionally zinc (Zn) and potassium (K). Food preparation (without fire) areas tend to look very similar to hearth areas, but usually have lower levels of Zn, K, and Mn (manganese). High levels of Zn have been found in one case to correlate with a latrine (Middleton *et al*. 2010), but in other studies (Middleton and Price 1996, Wilson *et al.* 2005, Wilson *et al.* 2007) correlates with burning on hearths, and in the absence of latrine areas, might be used to uniquely identify hearths.

Methodology

Sample collection

For each of the four hut circles, samples were collected in a cardinally-orientated grid pattern, with the sample points spaced 1 m apart (but 0.75 m apart in Hut Circle 28, due to its small size). This grid included all of the space within the boundaries of the collapsed walls[4], though there were many planned collection points from which samples could not be accessed due to interference of rocks, roots or trees. For Hut Circle 19 the boundaries of the structure were underestimated because the banks marking its former edges were not well defined, so the full interior of the structure was not sampled. The samples were collected from test pits at or just below the level of the living floor, with precautions taken to avoid contamination by soils from higher sediment layers. Plastic implements and containers were used for sample collection, to avoid possible contamination from abrasion of metal implements. When sample collection points coincided with previous excavation

3 This project was completed in 2014 as an undergraduate honours thesis in the Department of Anthropology at the University of Wisconsin-Madison.

4 Four control samples were also taken from 2-3 m beyond the boundary of each roundhouse structure in each cardinal direction. These controls however turned out not to be very useful as negative controls, as the areas outside of the roundhouses may have also been activity areas, and so were not considered in the statistical analysis.

trenches, the samples were removed from slightly below the Terram landscaping fabric that contained the backfilled soil. All samples were collected in August 2013, during which time Hut Circle 18 was being excavated.

Chemical analysis

All samples were chemically analysed for elemental content at the University of Wisconsin Laboratory for Archaeological Chemistry using a Varian 175-ES Inductively Coupled Plasma Optical Emission Spectrometer (ICP-OES). The samples were dried in an oven for 70 hours at 95°C, uncovered, but still contained in their original plastic collection vials. Next, all organic matter and particles larger than 0.5 mm were removed either manually with a small, flat scoop (samples 1-13 and 32-35) or using a sieve (ASTM size 60: samples 14-31 and 36-146). From each sample, 0.20 g (between 0.2000 and 0.2049 g) was weighed into a new plastic vial. The samples were digested in a 1 molar hydrochloric acid (HCl) solution made with three litres of 18-megohm ultra-pure deionized water (H20) and 250 ml of trace metal grade 36.5-38.0% HCl. This "weak" acid digestion was favoured over a stronger method that would release elements from the matrices of the soil particles, as the latter adds unnecessary noise to the anthropogenic residues present, and has shown to be less consistent than a weak acid digestion (Middleton and Price 1996). The soils digested in the acid solution for 18 full days, and were mixed seven times during that period by inverting and righting the vials three times. After the last mixing, the samples sat undisturbed for 24 hours to allow the contents to settle. Approximately half of the liquid content of each vial was then poured slowly in a new vial, avoiding transferring sediment particles as much as possible. Finally, the samples were tested with the ICP-OES.

Source	Elements considered	General activity indicators	Elevated near hearths	Elevated in non-fire food preparation areas	Other findings
Middleton et al. 2010	Al, Ba, Ca, Fe, Mg, Mn, P, Sr, Zn (note that K and Na are not tested	Ca, Mg, P, Sr	Sr, Mg, Ca	Sr, Mg, Ca	Zn: Latrine. Correlations between Sr, Mg and Ca likely from food residues. Fe deplated in areas of traffic. Al and Ba appear to reflect geochemical processes.
Middleton and Price 1996	Al, Ba, Ca, Fe, K, Mg, Mn, Na, P, Sr, Ti, Zn	Ca, Na and Sr	K, Mg (wood ash), and P, possibly also Mn, Zn	P, Ca, Al, Fe, Mg	Strong correlations between Al and Fe, Ca and Sr, and Ba and Sr best explained geochemically. Na is mobile and disappears over time.
Middleton 2004 (review article)		Mg, Ca, Sr, Ba ('Alkaline earths')	P, K, Ca (wood ash)	P, Ca	
Wilson et al. 2005	Al, Ba, Ca, Ce, Co, Cr, Cu, Dy, Eu, Fe, K, La, Li, Mg, Mn, Na, Nd, Ni, P, Pb, Sc, Sm, Sr, Ti, V, Y, Yb, Zn, Zr	Ca, O, Sr, Ba, Zn, Pb (Cu, Ni) (human and animal, living and farming)	Ca, Sr, Pb, Zn, (P)	not specifically discussed	Ba in middens, P in byres, Zn in houses
Wilson et al. 2007	Al, Ba, Ca, Ce, Co, Cr, Cu, Dy, Eu, Fe, K, La, Li, Mg, Mn, Na, Nd, Ni, P, Pb, Sc, Sm, Sr, Ti, V, Y, Yb, Zn, Zr	Ca, Mg, Cu, Ba, Li, Na, Nd, Ni, P, Sr	Ca, P, Ba, Cu, Sr, Zn	not specifically discussed	
Balbithan Project	Al, Ba, Ca, Cu, Fe, K, Mg, Mn, P, Sr, Zn	(areas were not archaeologically identifiable)	Zn, Mg, (Al)	(areas were not archaeologically identifiable)	

Table 4: Overview of correspondences between residue trace elements and human activity.

Statistical analysis

Of the 28 elements detected by the Spectrometer, 11 (Ca, Al, P, Cu, Ba, Mg, Mn, K, Fe, Sr, and Zn) were selected for analysis because their levels were sufficiently high to be accurately measured by the spectrometer, and because these have been shown likely to evidence anthropogenic activity (Middleton *et al*. 2010, Middleton 2004, Middleton and Price 1996). Sodium (Na), although it met these criteria, was rejected from consideration because of high ambient levels. Sample 55 was also removed from consideration due to an error in its preparation. Using DataDesk software (version 6) the logarithm for each measurement was calculated. A principal components analysis was performed for each hut circle separately, and a fifth principal component analysis was performed on the data from all structures collectively (see tables in the site archive).[5]

Results and discussion

Components and interpretations

In total, 135 samples were successfully collected and included in the principal components analyses (see tables and appendices in the site archive). Despite differences in immediate environments and dates between the hut circles, the elements that contain the greatest variation within the structures are the same for all of the structures. This strongly suggests that this variation was caused by a *more* inconsistent variable shared between them: diverse human activity. Remarkably, the principal components analyses for each hut circle as well as the one for all the samples combined returned very similar results for the composition of the first component (see tables in the site archive). Additionally, within the Component 1 analysis of all samples together, the ordering of the points in each structure established when sequenced according to its own Component 1 is largely preserved (Figure 28). This confirms that the range and nature of the chemical variation found within each structure individually is similar to that of the samples as a collective, and suggests that the variation is similar enough that the signatures can be directly compared between structures.

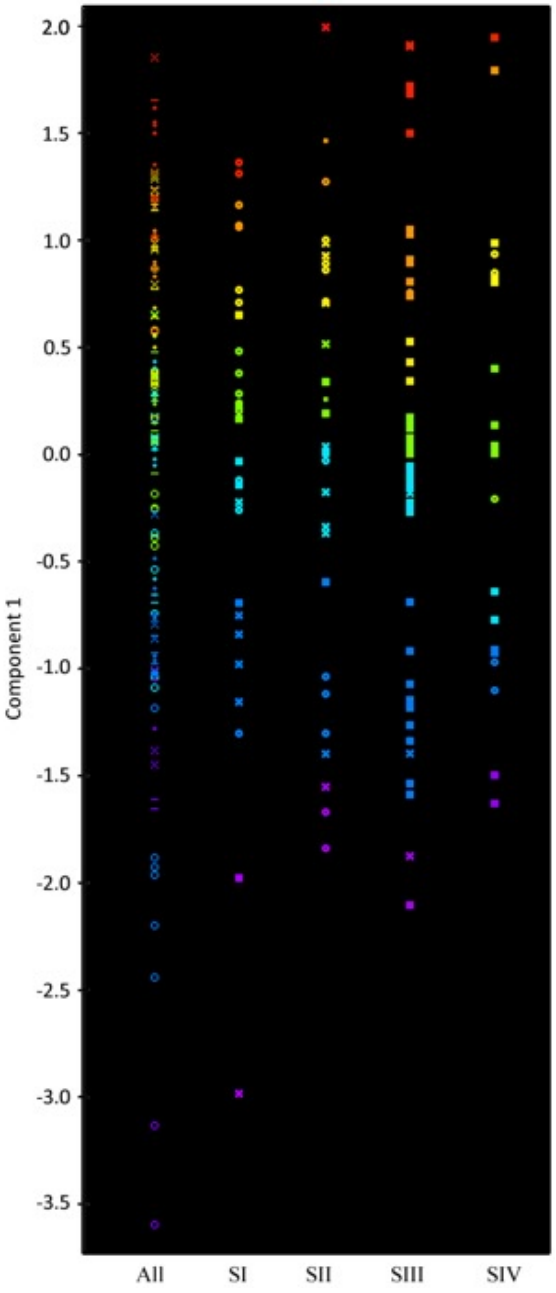


Figure 28: Visual comparison of individual structures' PCA results to all structure PCA results SI= Hut Circle 17, SII= Hut Circle 18, SIII= Hut Circle 28, SIV= Hut Circle 19.

5 These principal components analyses first identify the variables (elements) that together account for the greatest variation within the sample set. They then combine the variables in proportion to create factors representing the primary, secondary, tertiary (and so forth, so that the number of factors is equal to the number of variables) measures of difference determined by those variables. Thus, the samples at the extreme ends of Component 1 represent the two most different samples in the set.)

From previous studies, increased levels of Ca, P, Sr, Mg, Ba, and Cu correspond with areas of human activity in general, while these elements in addition to elevated levels of K, and Zn are often indicators of hearth areas. Since Component 1 is most significantly defined by Zn, Mg, K, Cu (except in Hut Circle 17 where Cu is far less influential), and Ba, it is concluded that Component 1 in all cases measures variation in hearth activity, with secondary influences of general activity indicators[6].

This hypothesis is supported by evidence from excavations: the samples taken from the structure walls represent the lowest points on the Component 1 scale, and, perhaps more significantly, the hearths uncovered during excavations in Hut Circles 17 and 28 are both within a metre of the maximum point on the Component 1 scale. G8 is not only the point highest on Hut Circle 17's Component 1 scale, but it also has a significantly higher level of zinc than any of the other points in the structure, including G5[7] (see appendix in the site archive). These two facts suggest G8 as a more likely hearth location than G5, matching the location of the actually excavated hearth.

Component 2 for Hut Circles 17, 18 and 28 are most strongly influenced by Fe, P, and (negatively) Ca. The presence of Fe might distinguish non-fire food preparation areas from other areas, and P is an indicator of non-fire food preparation areas and human activity generally. Ca, which can be an indication of general human activity, is often elevated in hearths particularly, so the low end of the scale is more similar to hearths in terms of Ca levels (Middleton *et al.* 2010, Wilson *et al.* 2005, Wilson *et al.* 2007). Based on this information, a probable interpretation of the function of Component 2 in these three hut circles is that it serves to distinguish non-fire food preparation areas from other areas more generally, and from hearths more specifically.[8] Hut Circle 19, however, shows a very different pattern in its Component 2 results, as in contrast to the other structures, Sr and Mn are the two strongly opposing factors, and Fe is almost inconsequential.

Interpretations and inferences concerning the use of space

When the samples are graded and grouped by component score, spatial patterns in the layout of samples within each structure become visible. In Hut Circle 17 (Figure 29), the plotted samples graded by Component 1's scale (Figure 28) show that there are two high points, G8 in the centre and G5 at the western edge. The next three samples on the high end of the scale are adjacent to these two high points, showing an extended activity area surrounding the hearth. Most of the lower points on the Component 1 scale are found in or near the banks covering the walls of the structure, however there is also a cluster of low points in the south-west of the structure, which could have been a sleeping area. Component 2 patterns extremely well spatially for this structure, spreading almost consistently from high to low in a north-east to south-west direction (Figure 30). Non-fire food preparation likely took place in the west and south-west portion of the structure based on samples with high levels of Component 1 and Component 2 in this area. The south-east portion of the structure contained numerous rocks that prevented sampling, probably from the collapsed wall in that direction.

6 The opposition in Component 1 of strontium to these other indicators of human activity is puzzling, but may be explained by a generally high ambient level of strontium. This could cause the areas of low human activity to appear to be relatively high in strontium, because the element is more prevalent in proportion to the anthropogenically enhanced ones.

7 A possible interpretation for the high level at G5 is an ash-dump location.

8 Another possible (but perhaps less likely) explanation for why calcium levels might be elevated in an area is from the presence (and necessarily in this case dissolution) of bones. The primary mineral content of bones is hydroxyapatite, of which calcium is a primary component (White *et al*. 2012, 28). This material reacts very easily with soil, and would leach calcium readily if buried (Burton 2008). Possible reasons why bone might be buried in a dwelling include inclusion in a midden, as a votive deposit (see Brück 2008), as flakes or shavings resulting from carving bone objects, or if a burrowing animal died underground (a very possible, non-anthropogenic explanation, as rabbit warrens are common in this area), however precautions were taken to avoid sampling floors disturbed by warrens.

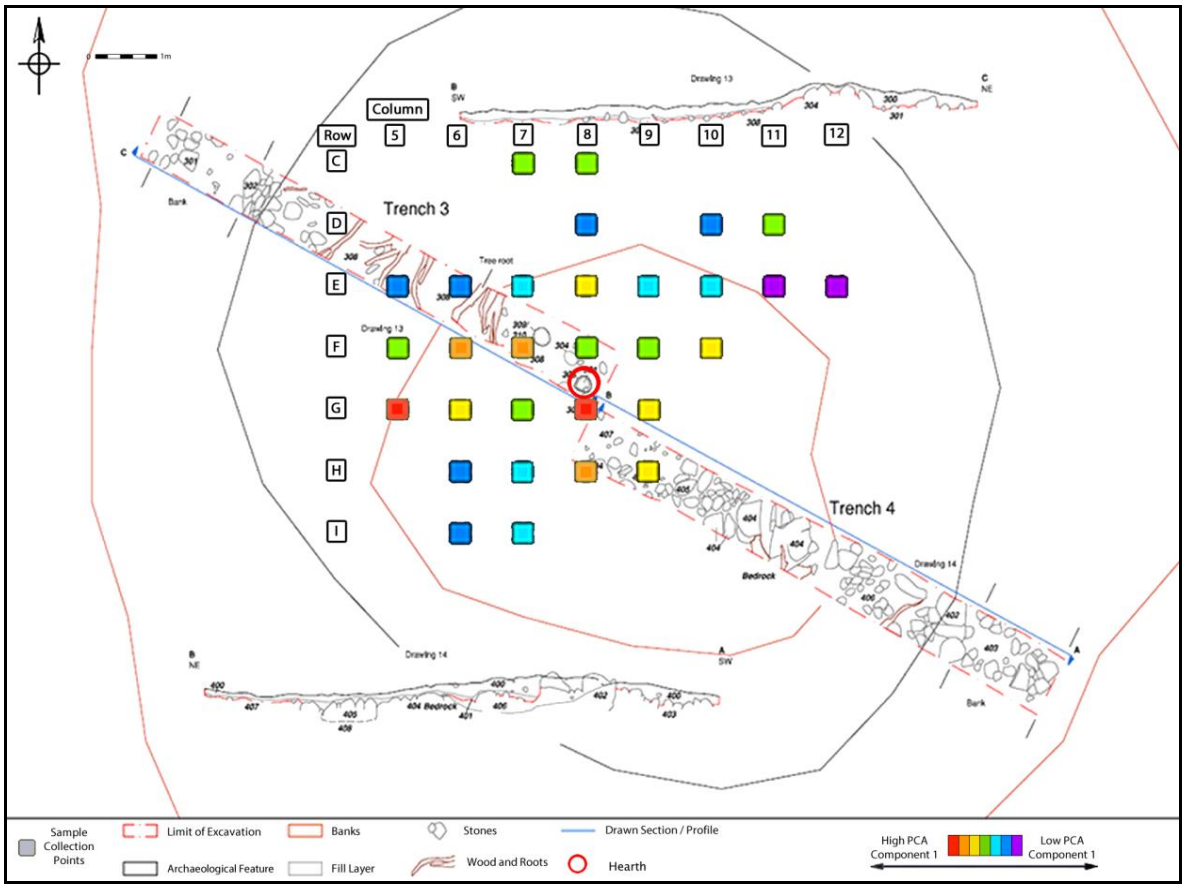


Figure 29: Hut Circle 17 results coloured by grouping on the Component 1 scale, superimposed on the excavation drawing.

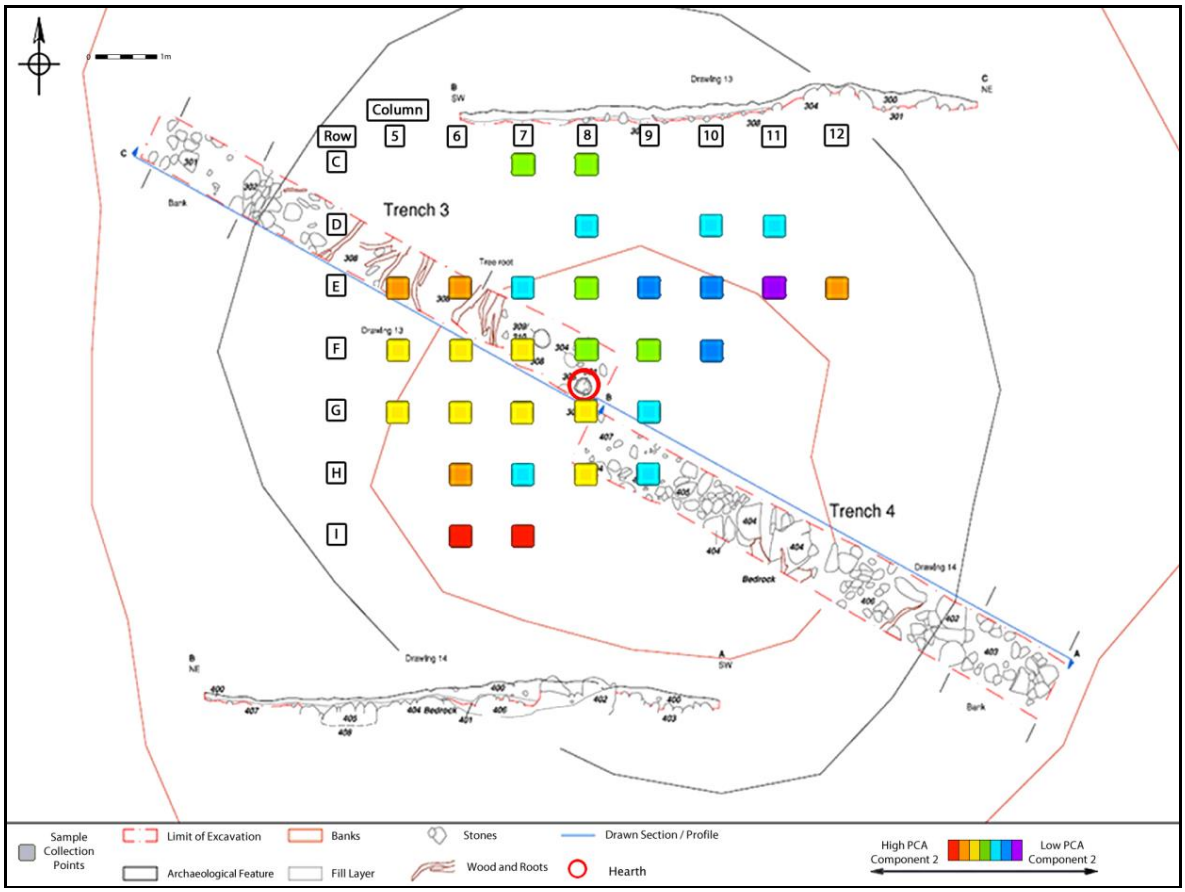


Figure 30: Hut Circle 17 results coloured by grouping on the Component 2 scale, superimposed on the excavation drawing.

Hut Circle 18 also has visible spatial patterning, though the divisions are a little less sharp than in Hut Circles 17 or 28 (Figure 31). The highest point on the Component 1 scale is located in the centre of the structure at D4, suggesting that this was the location of the hearth, however, this location was also the location of a modern bonfire which may have complicated the readings. The next two highest are on the southern edge, traditionally where a doorway would have been located. If the doorway was indeed on that side of the dwelling, or in the south-west or south-east, this spot would have been optimal for taking advantage of daylight. The western part of the structure contains most of the low points (excluding those at B5 and C6), with the lowest points being near the walls. Component 2 shows some spatial mixing of the points as well, though some trends are still visible (Figure 32). Several low points are clustered in the north-west quadrant of the structure, with high areas at the extreme east and west ends, suggesting that food preparation might have taken place at the west or east edges of the building. The lowest point on the Component 2 scale is almost centred at D5, matching the interpretation of low Component 2 levels aligning with hearth-like activity.C3, B4, and A5 show a diagonal line of mid-range Component 1 levels and low Component 2 levels, which may indicate another activity signature.

In Hut Circle 28 (Figure 33[9]), the highest point on Component 1 is C5 near the centre of the structure, with the next highest points clustered around it at C4 and D5. The hearth excavated in this structure is directly between these three points. With the exception of two points (coordinates E3 and F4), the lowest points are located in or near the structure walls. Midrange points are mostly clustered in the south-west quadrant. For Component 2 (Figure 34), there is a cluster of high sample points in the west portion of the structure, and another in the north, suggesting a non-fire food preparation area. These two clusters could very well be connected if the missing samples from the north-west part of the structure had been available. Again, some of the lowest Component 2 readings came from C4 and D5, supporting the idea that the high calcium on the low end of the Component 2 scale is a result of burning. Animal burrows, a large tree and its roots, and rocks prevented sampling at the unreported points.

The fact that the three structures that are archaeologically very similar produced very similar results in these principal component analyses also supports the hypothesis that, at least within the area of this site, similar activities will create similar chemical signatures. Based on this confirmation, we can then project these interpretations of the observed activity signatures onto the structure whose purpose is less clear: 'Hut Circle' 19.

Hut Circle 19 shows spatial patterning along its Component 1 scale to be rather different than in the other hut circles (Figure 35). Its five highest points, which are separated from the rest of the points by a considerable space along the component, are not adjacent but rather clumped in three areas which are separated by at least 2 m and stretch along the west of the sample area.

Because the high degree of similarity between the Component 1 composition for Hut Circle 19 and that of the others, we can infer that the activities measured by this component occurred in this structure as well, specifically burning in situ (similar to that which took place at hearths) and also detectable amounts human activities in general. The lowest sample points (except D4) are found in or near the banks indicating the edges of the structure. A group of medium-low points are also found surrounding the stone setting, which may be packing for a timber post.

For Component 2, the highest points can be found in the south-east corner of the collection area (Figure 36), suggesting an activity area here despite the presence of the bank of stones. The low points are also grouped loosely in the centre of the structure, covering a large portion of the sample area. The difference in the composition of Component 2 for Hut Circle 19 compared to that of the other structures suggests that the

9 There was some discrepancy in the alignment of the excavation drawing with the soil sample grid for the hut circle, due to a misreading of north in one case. To resolve this, North was ignored for the excavation drawing and these two plans were instead aligned based on the observed location of the trench during soil sampling, as well as that of a large tree currently growing in the centre of the structure.

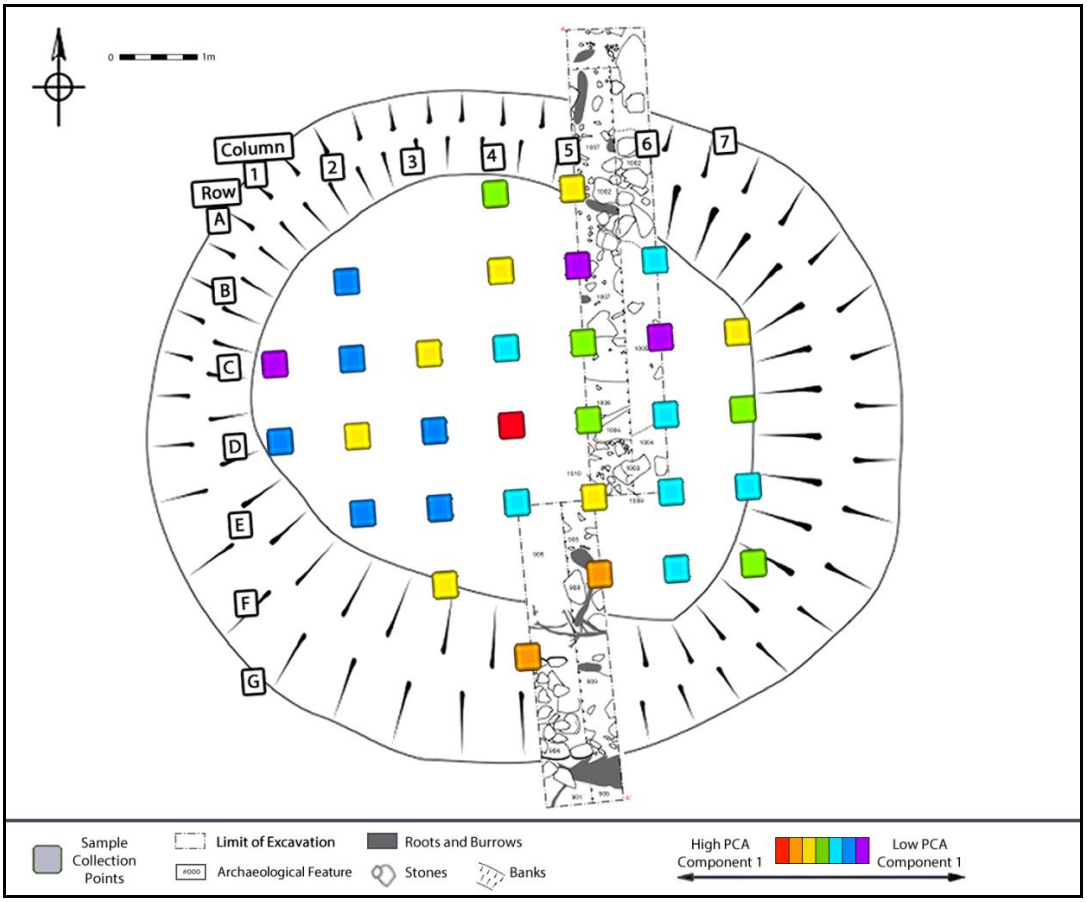


Figure 31: Hut Circle 18 results coloured by grouping on the Component 1 scale, superimposed on the excavation drawing.

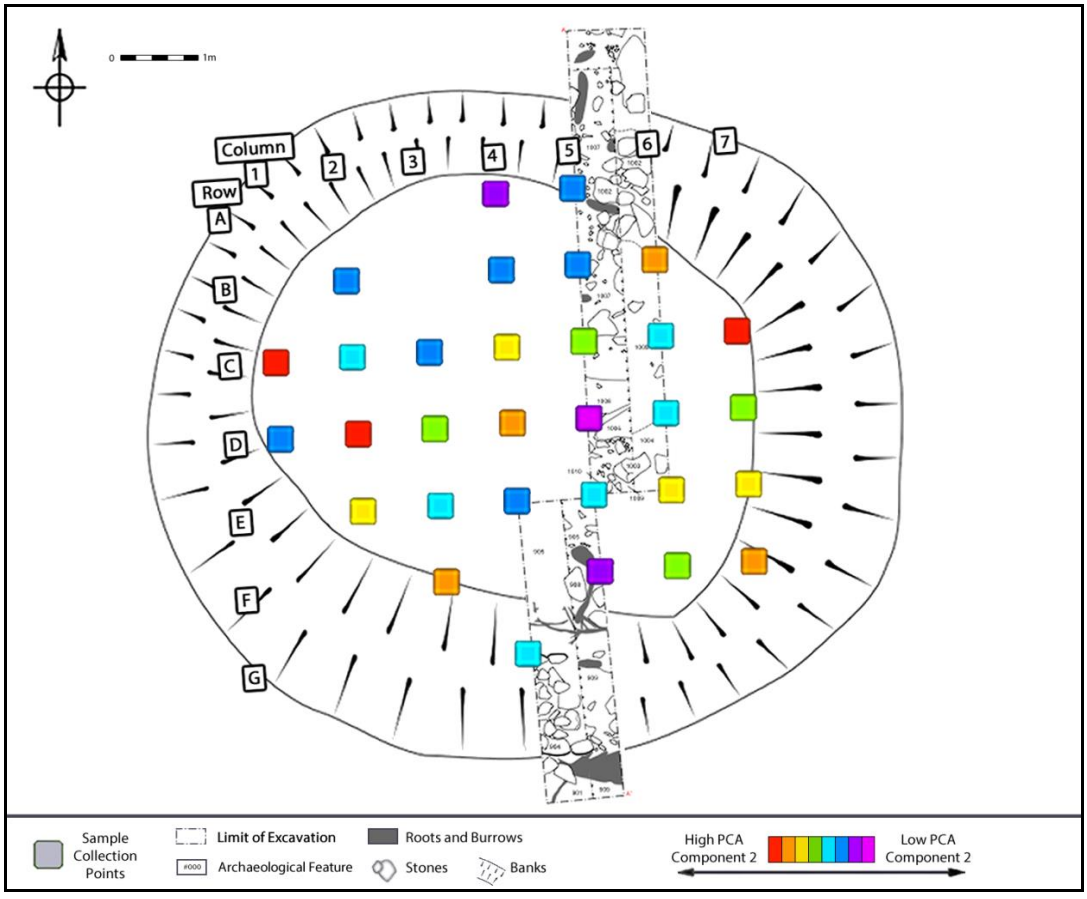


Figure 32: Hut Circle 18 results coloured by grouping on the Component 2 scale, superimposed on the excavation drawing.

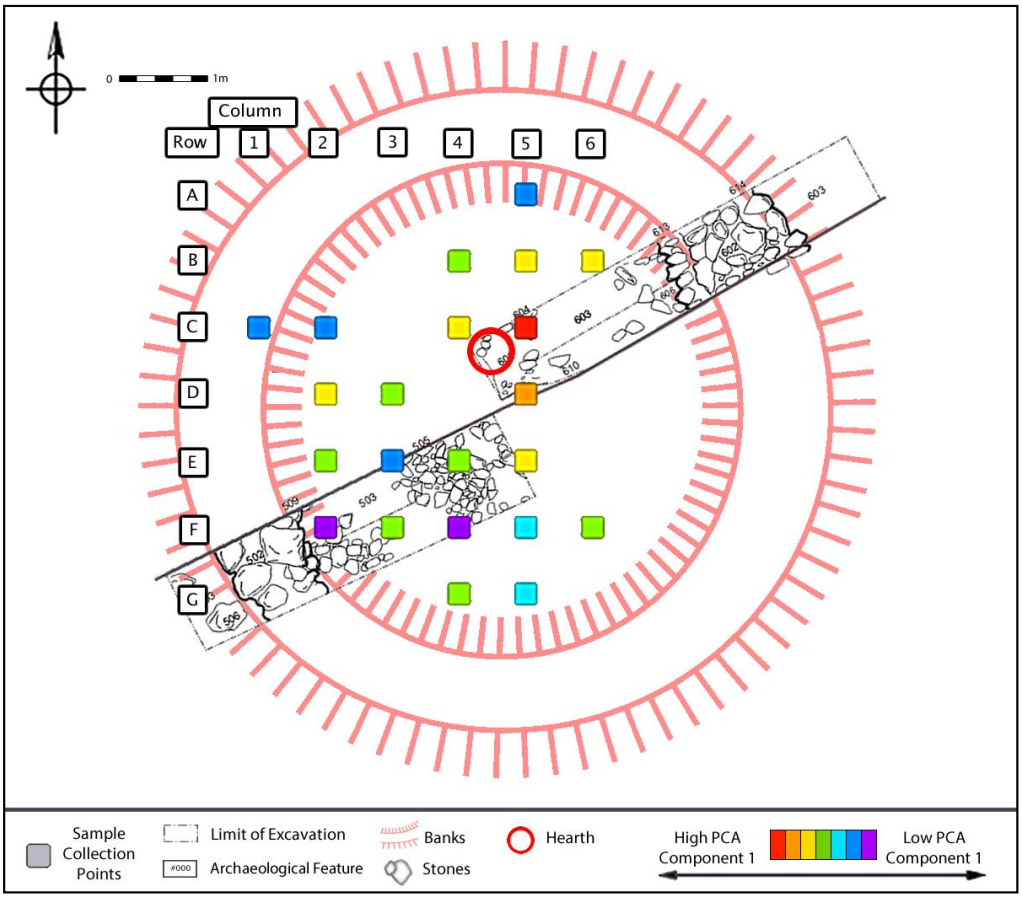


Figure 33: Hut Circle 28 results coloured by grouping on the Component 1 scale, superimposed on the excavation drawing.

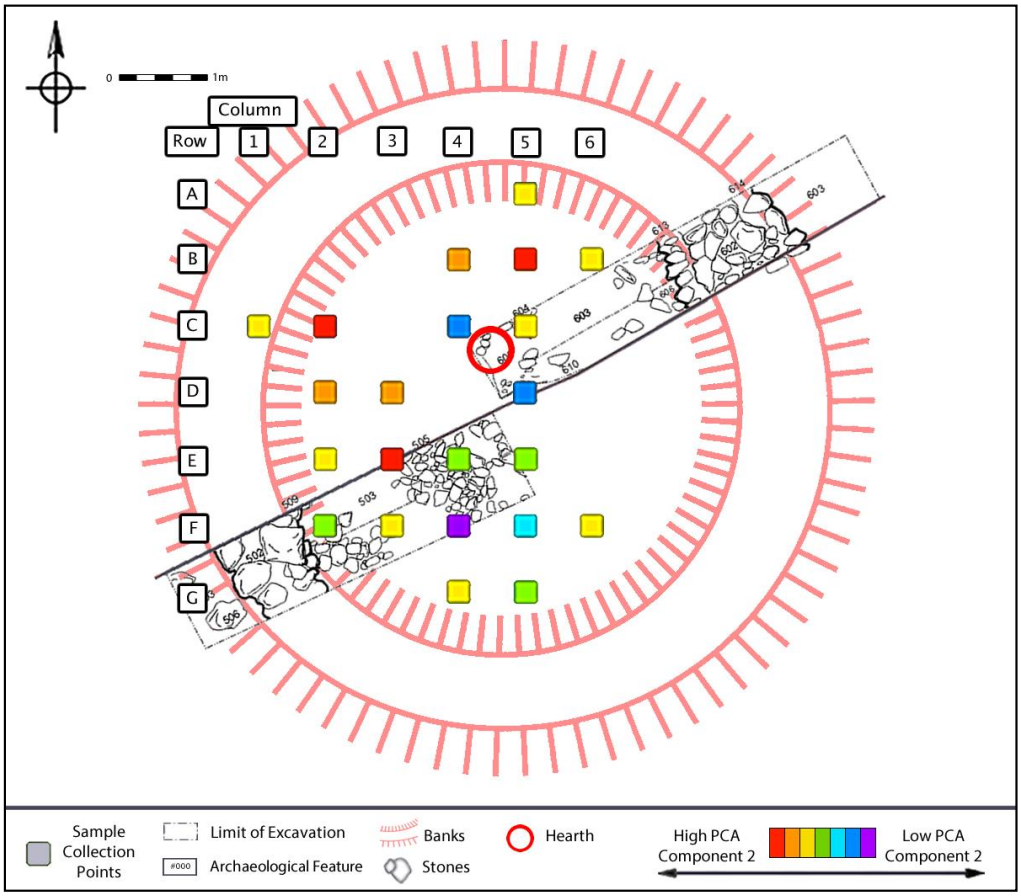


Figure 34: Hut Circle 28 results coloured by grouping on the Component 2 scale, superimposed on the excavation drawing.

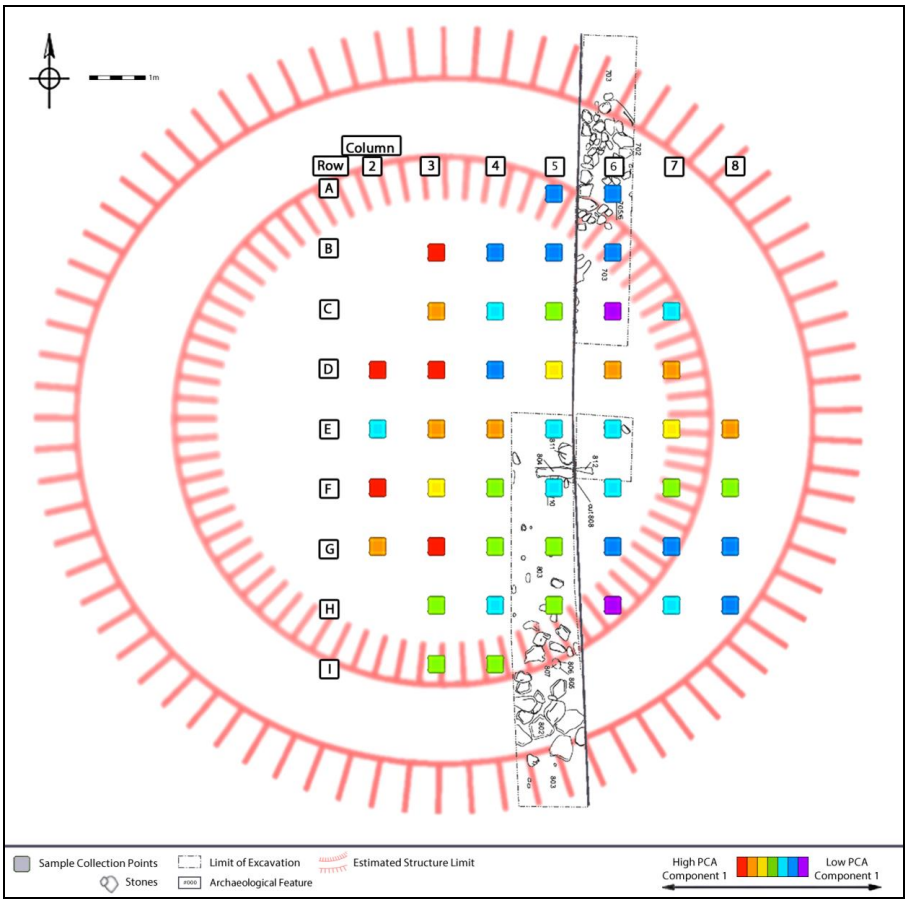


Figure 35: Hut Circle 19 results coloured by grouping on the Component 1 scale, superimposed on the excavation drawing.

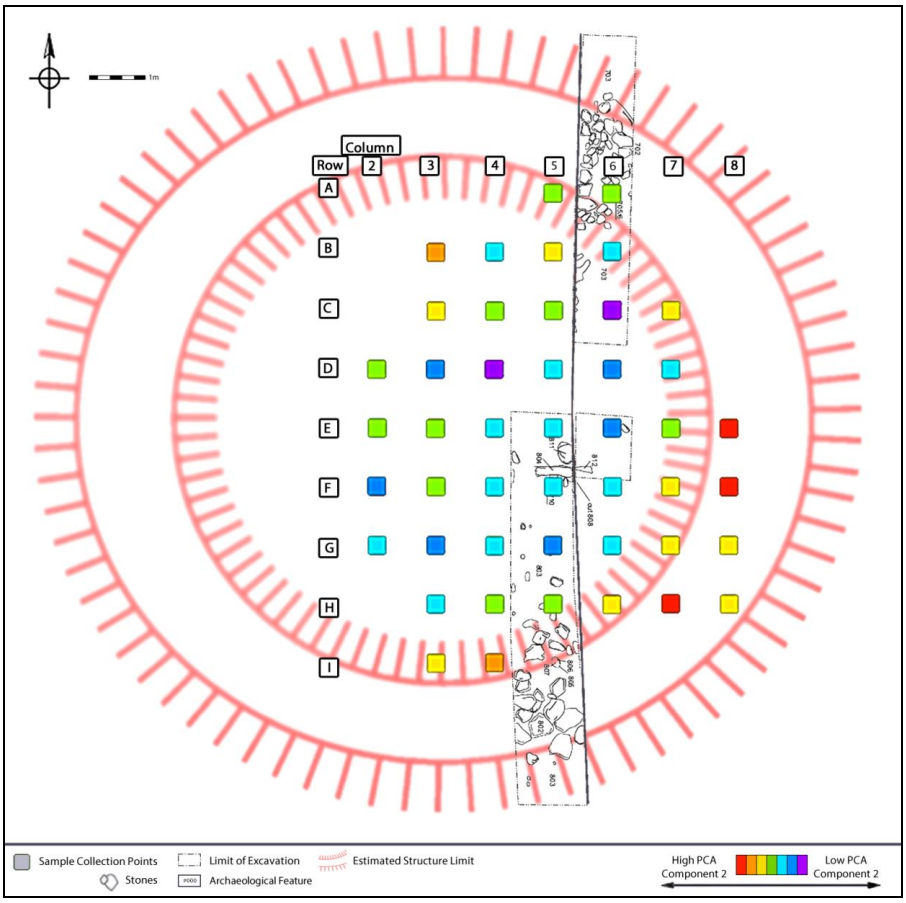


Figure 36: Hut Circle 19 results coloured by grouping on the Component 2 scale, superimposed on the excavation drawing.

activities that took place in this structure were likely not identical to those that occurred in the dwellings. A multitude of causes could explain the discrepant composition of Hut Circle 19's Component 2, and without further evidence one can only speculate. However, if Component 2 in Hut Circles 17, 18 and 28 does indeed distinguish between areas of non-fire food preparation and others, the absence of this activity within Hut Circle 19 could account for the difference in the nature of Component 2 in this structure compared to the others.

The most important point to note about Hut Circle 19 however is that, although the types of activities taking place in this structure were probably somewhat similar to those taking place in the other structures, the patterning of these activities was significantly different (Figure 35). Rather than one central hearth, we see at least three hearth-like areas. There may have also been a unique activity occurring around the stone setting, based on the similarity of the four samples surrounding it (both for Components 1 and 2). Component 2, regardless of whatever activities (or non-anthropogenic factors) it might represent, shows one large area in the centre and one or more areas around the edges. The low points at F2, G3, and D3 curiously correlate with sample points high in Component 1 levels, perhaps indicating a secondary activity also happening at those locations. Unfortunately, the western part of the structure was not sampled due to time constraints and a miscalculation of its size, so we do not have information on that portion of the structure.[10]

In conclusion, the chemical signatures assessed in this study support the interpretation of Hut Circle 19 as either a different type of structure, or as a hut circle used differently from the other three examined. We also see that, while adhering to the layout of a centrally located hearth, in terms of secondary activity areas people were not so culturally constrained as to preclude the creative use of interior space.

Lithics and coarse stone tools

By Antony Dickson

Introduction

The following report is concerned with the quantification and description of the worked stone recovered during the second to sixth seasons of work on site which produced a lithic assemblage amounting to 320 pieces (Table 5). This assemblage contains three indeterminate chunks, which probably represent unworked quartz, and one flint flake can be classified as a thermal removal. These items are included in Table 5 but are not discussed further.

Season	Number of lithics	% of total
2011	79	24.69%
2012	83	25.94%
2013	86	26.88%
2014	51	15.94%
2015	21	6.56%
Total	320	

Table 5: The amount of worked stone recovered during each season.

The worked stone was derived from test pits and trenches excavated across and within the vicinity of a number of structural features: Hut Circles 5, 17, 18, 19, 28 and 29 produced the bulk of the assemblage, 268 pieces (84%), whilst those associated with the excavation of several cairns yielded 43 items (13%), and the enclosure eight (>3%). A single piece of worked flint is unprovenanced in terms of its relation to any of the excavated features. Furthermore, the assemblage includes flaked lithics produced from working flint nodules and other raw materials, and pieces made on larger flint and stone cobbles classified as coarse stone tools.

The small find numbers contain both the year of excavation and the individual find number, and multiple objects, where placed in the same bag, were given a subsequent letter code: thus small find 16 from 2011 containing three objects expressed as 2011-16a, 2011-16b and 2011-6c. The detail analysis of all the finds can be found in Appendix 1.

10 The results of the principal components analysis for Hut Circle 19 helped to identify the general shape of the structure's boundaries, and infer that its size is greater than originally thought.

Methodology

Flaked lithics

All struck lithics from the excavations have been the subject of a detailed typological and technological attribute analysis and it is the results of that work which forms the bulk of the following report. The analyses involved recording the physical characteristics of the worked stone, with raw material identification, and the metrical and attribute analysis of tools and debitage.

Cores were characterised by the type and number of platforms. Blade and flake scars on core flaking fronts were also recorded by type and number in order to further define reduction strategies.

The technological characterisation of the debitage was based upon a number of attributes including fragmentation, surface modification by heating and/or post-depositional processes, an assessment of the orientation of scars on the dorsal surfaces of flakes and blades, the characterisation of platforms, and the categorisation of flake and blade terminations.

Flakes and blades were also characterised and quantified in terms of their position within a generalised reduction sequence. Each complete blade and flake blank was assigned to primary, secondary or tertiary stages. Such an approach has its limitations, and it necessarily needs to be set alongside more qualitative observations on flake character and on the nature of broken material. However, it does provide a basis for establishing whether or not particular assemblages contain all, or only certain stages in the reduction of particular cores and/or tools.

An attempt was also made to identify the use of flakes, blades and other pieces. This was based upon macroscopic inspection of each piece and a characterisation of use wear in terms of retouch, edge wear, serration, and edge gloss. Although this can be relatively straight forward to identify on some modified tool types, edge damage can also produce similar abrupt scar patterns to simple miscellaneous retouch and caution has been followed when classifying such pieces.

Coarse Stone Tools

Complete and fragmentary cobbles exhibiting evidence for use in the form of worn and abraded surfaces have been classified as coarse stone tools. These pieces exhibit no evidence for having been flaked and their utilisation is solely related to use as hammers or smoothers and grinders. Each piece has been macroscopically examined and the location, extent and character of the use wear have been recorded, along with length, breadth and width dimensions where applicable.

Reporting

The results of the overall analysis are presented below by reference to primary and secondary technology. The former describes the core technology, and its associated by-products, and blade, flake and indeterminate debitage. The secondary technology includes all items identified as modified and edge utilised blades and flakes. The text is supplemented with tables and illustrations of specific artefacts in order to elaborate on the discussion of the worked stone.

In addition, the worked stone is also discussed in relation to its spatial associations with the excavated features in an attempt to define which elements of the assemblage could be related with activity in specific areas of the site.

The results of the analysis have been entered into a lithic catalogue which forms part of the site archive. When specific items and referred to in the text they are referenced by their small find number.

The flaked lithic assemblage

Raw materials

In terms of the flaked lithics (as opposed to the coarse stone tools) flint is the dominant raw material type represented within the assemblage (Table 6). The cortex identifiable on this material indicates that the majority, if not all, can be classified as pebble flint. It varies significantly in colour, and slightly less so in grain size and inclusion type, indicating that it is generally of a similar quality, and is used in all stages of the

reduction sequence (Table 6). In terms of colour, grey flint is prominent (42% of all material with an identifiable colour i.e. not burnt), with yellow (31%) and brown (16%) material also being relatively common. The remainder consists of black, brownish grey, greenish brown, and red flint, with the latter comprising 9% of the identifiable material. It should be noted that some of the grey flint has a yellowish tinge which indicates that some staining of material could have taken place, although whether this was at source or related to local soil mineralisation cannot be confirmed. This could be of relevance as the analysis of a lithic assemblage, just to the south of the site at Kintore, identified that half of the assemblage was made on yellow flint. Additionally, grey flint use was also significantly less than that at Balbithan whilst red flint was relatively more common (Engl 2008). It is unclear as to what these apparent differences in pebble flint colour mean but perhaps relate to differing sources of raw material. There is sound evidence for the splitting of pebbles and setting up of cores at Balbithan, which indicates that colour at source might not have influenced the selection of raw materials. However, the way different coloured material was treated on site may be of relevance (ibid. see below). Pebble flint is available from a variety of sources in north-east Scotland including coastal and riverine contexts (Wickham-Jones and Collins 1978, Engl 2008) and a significant source is located at Buchan Ridge (Wickham-Jones 1986), c. 18 km to the north of the site.

As well as the flint, small quantities of other raw material types were also used for the manufacture of flaked lithics (Table 6). Material not determined, primarily relates to burnt items and most of this is likely to be flint, however, two items with this classification could represent a chalcedony/jasper, and it is of note that both pieces were recovered from the same feature (see below). A further two pieces could represent a type of flaked chert but this identification is uncertain. Quartz was minimally utilised at Balbithan (Table 6) and this material varies from opaque milky quartz to finer grained rock crystal, although the latter is significantly rarer than the former. In addition to the flaked lithics, a possible granite cobble and examples made from quartzite were selected for use as coarse stone tools. All of the unburnt but not determined material, and the other raw material discussed above, could have been recovered from sources local to the site.

Lithic type/class	Not determined	Flint	Granite	Quartz/ quartzite	Total	% of total
Arrowhead		3			3	0.94%
Awl		2			2	0.63%
Blade	1	16			17	5.31%
Coarse stone tool			1	4	5	1.56%
Combination tool		1			1	0.31%
Core		9			9	2.81%
Denticulate		1			1	0.31%
Flake	5	150		10	165	51.56%
Flaked pebble		7			7	2.19%
Indeterminate chunk	4	27		9	40	12.50%
Indeterminate fragment	2	34		5	41	12.81%
Knife form		1			1	0.31%
Miscellaneous retouch		2			2	0.63%
Scraper		13			13	4.06%
Small flakes		13			13	4.06%
Total	12	279	1	28	320	
% of total	3.75%	87.19%	0.31%	8.75%		

Table 6: Quantification of the entire worked stone assemblage by lithic type/class and raw material.

Primary Technology

Flaked pebbles

Seven flaked pebbles (Table 6) were recovered from Cairn 271, Trench 12. All the pieces are representative of the working of pebble flint and are roughly of the same size with mean dimensions of 45.77 by 34.34 by 11.24 mm. Partially flaked flint pebbles can be representative of raw material testing, however, the specimens from Trench 12 do not appear to represent such a process. All show evidence for having been split/worked using bipolar reduction, and represent raw material which is of a relatively favourable quality. Four were subsequently flaked further with one item (SF 2013-0010d, Figure 37) exhibiting a maximum of four flake scars on the inner surface. The remainder represent unworked split pebble fragments and two pieces conjoin (SF 2013-0010h and 2013-0010i, Figure 37). The latter suggest that the working and deposition of the pebble fragments was undertaken within a relatively constrained time frame.

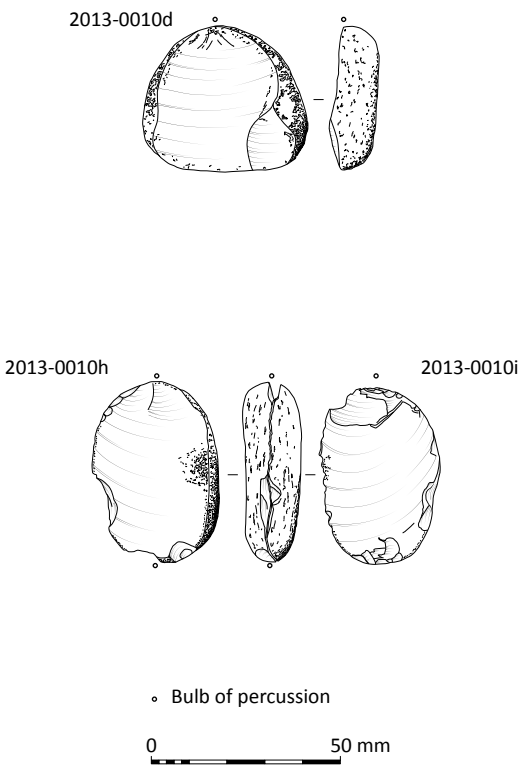


Figure 37: Flaked pebbles from Cairn 271.

Core technology

In addition to the flaked pebbles noted above two possible cores (Table 6) were also recovered from Trench 12, Cairn 271. Both cores are made on fragments of flint pebbles which have also been split using platform on anvil/bipolar reduction. They have similar flaking trajectories to disc cores, being flaked from the perimeter of the split pebble, with one exhibiting three flake scars whilst the other has eight and shows the clearest evidence for having been intentionally flaked as a core (SF 2013-0010a, Figure 38). The other cores comprise three worked from single platforms, three bipolar cores, and a core on a flake.

The single platform cores were mainly worked for the production of flakes with only one specimen exhibiting a blade scar. All three single platform cores are made on flint, two of which can be identified as pebble flint and the other is also likely to be made from the same material. One specimen SF 2011-0002a exhibits clear evidence for crushing and heavy abrasion on the platform and the base indicating that it was also worked using bipolar reduction. A second piece is almost like a disc core in morphology (SF 2013-0025a, Figure 38), but probably represents a core on a flake which has been worked irregularly, fully around the circumference of the platform, which is corticated, and is very irregular in form. The third piece is much smaller in dimensions than the others and is less intensively flaked.

The bipolar cores are relatively smaller than those worked from single platforms and two are derived from interventions associated with Hut Circle 18. All are a product of the reduction of flint. One example (SF 2013-0004i), associated with Hut Circle 18, probably represents the reworking of on an older piece of flint as one face has typical bipolar reduction attributes, whilst blade removals struck from another platform dominate the opposite face. A second example (SF 2013-0025b, Figure 38), associated with the same feature, is a particularly fine specimen and is likely to be of an early prehistoric technology, most likely relating to late Mesolithic stone working traditions. The third piece was probably detached from a larger nodule during bipolar reduction, and in that respect it is more likely to represent a core fragment.

The core on a flake exhibits an irregular flaking trajectory and has been worked from at least two platforms. It is probably better described as a partially flaked chunk and has been worked using a hard hammer.

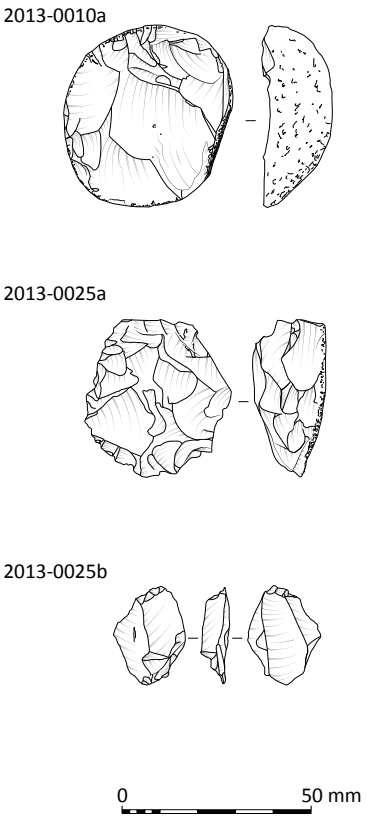


Figure 38: Flint cores from Cairn 271.

Debitage

The assemblage is dominated by flakes, with only a small number of blades recorded, along with a significant quantity of fragmented and chunky indeterminate waste (Table 6). Of the blades (pieces with a length/breadth ratio of 2.00 or greater, Figure 39) all are from the reduction of flint cores, most likely pebble flint, however, only six pieces are complete. They are all of quite broad dimensions and are predominantly from the later stages of the reduction process (Table 7, Figure 40). The complete blades have length/breadth ratios ranging between 2.00-2.49 (Figure 39) indicating that they are just over two times longer than they are wide. Indeed, two of the complete blades can be described as flakes with blade-like dimensions.

Only five blades, comprising complete and fragmentary pieces, can be classified as true blades: they are parallel sided with narrow platforms and evidence for blade scars on their dorsal faces. The majority of the remaining blades appear to have been removed through the use of hard hammer and/or bipolar reduction. Broken and complete items often have crushed terminals, and incipient cones are a common feature, indicating a hard hammer, direct percussive force was applied during reduction.

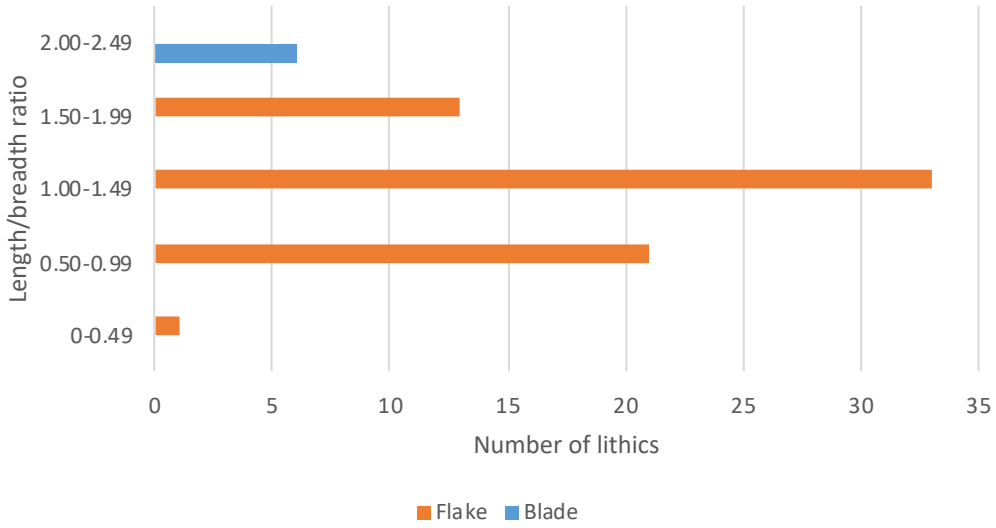


Figure 39: Length/breadth ratios of all complete blades and flakes.

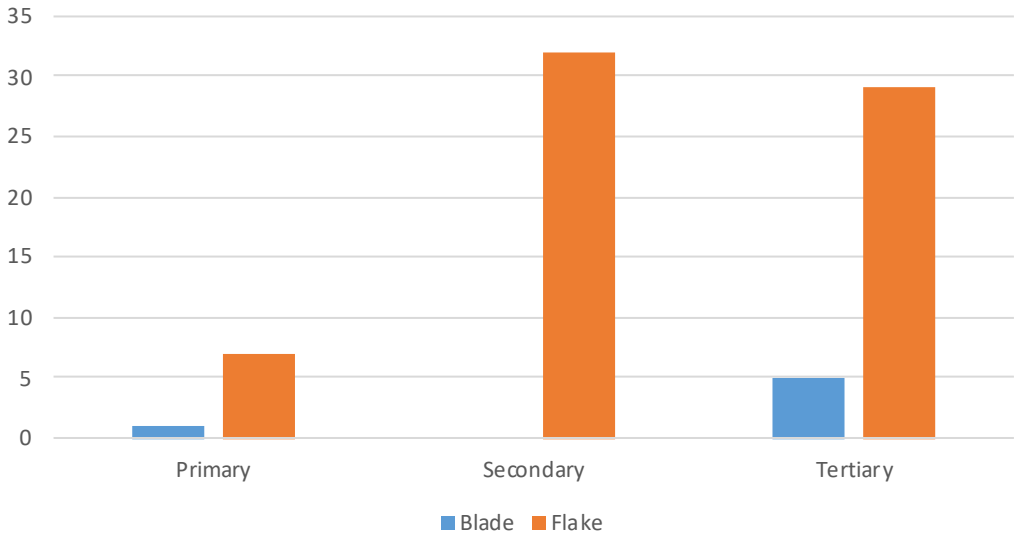


Figure 40: Complete blades and flakes quantified by their position in the reduction sequence.

Type	Average length mm	Average width mm	Average thickness mm	Number
All blades	25.43	11.9	3.53	6
Primary flake	29.23	23.44	6.36	7
Secondary flake	21.93	19.18	5.4	32
Tertiary flake	20.65	18.74	4.84	29
All flakes	22.14	19.43	5.26	68

Table 7: Average mean dimensions for all complete blades and flakes (also by reduction stage for the flakes).

The technological analysis of the few complete blades appears to back up this observation as the majority have crushed platforms (Figure 41). Furthermore, none exhibit evidence for the preparation of the core platform edge prior to their removal (Figure 42), and interestingly, given the evidence for the use of hard hammers noted above, only one of the blades has a pronounced bulb of percussion (Figure 43), a trait usually associated with hard hammer percussion (Butler 2005, 37). On the whole the blades have feathered terminations (Figure 44) implying that even though bipolar and/or hard hammer reduction was used some measure of control during blank production was maintained. The direction of dorsal scars suggests that blades were predominantly removed uni-directionally from cores/nodules (Figure 45).

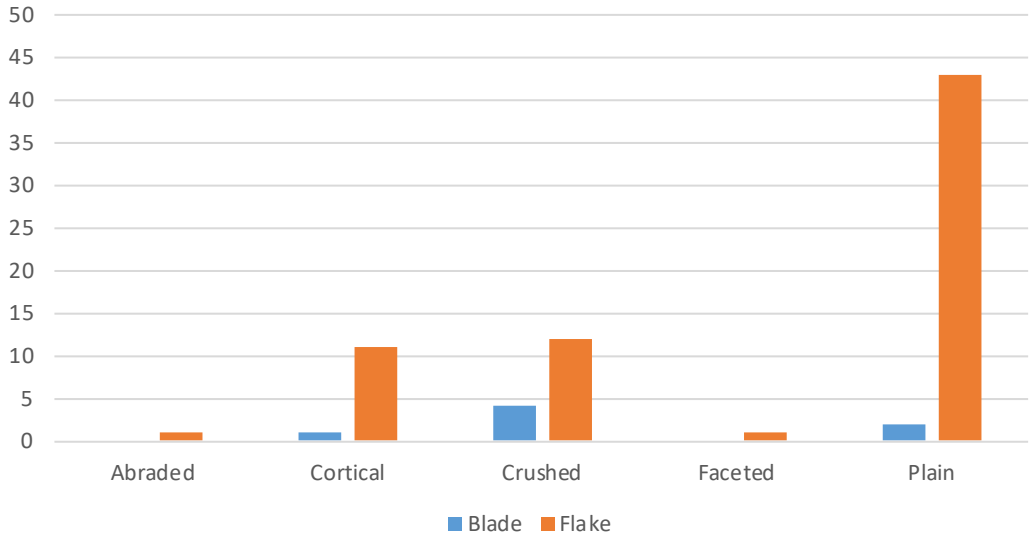


Figure 41: Complete blades and flakes quantified by their platform type.

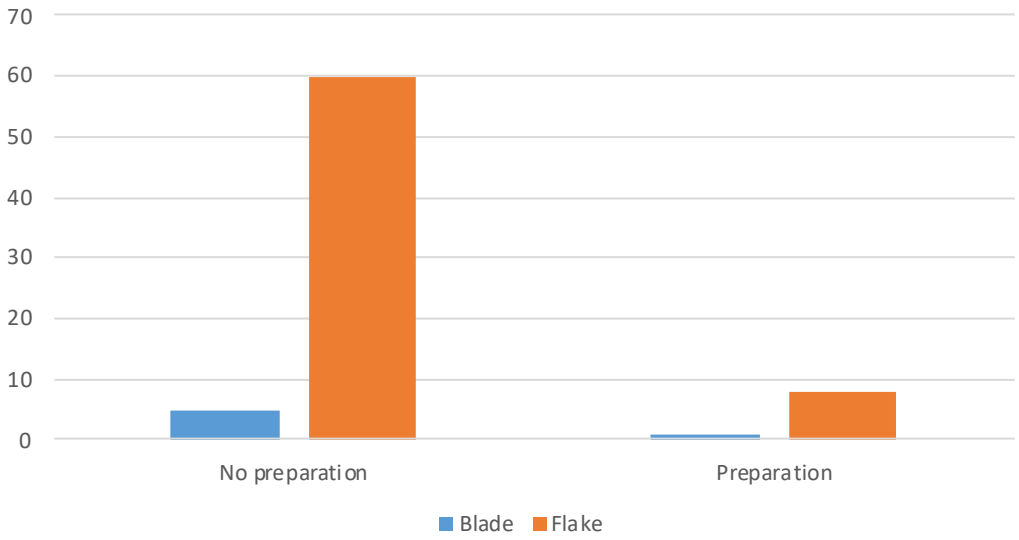


Figure 42: Complete blades and flakes quantified by the occurrence of platform preparation.

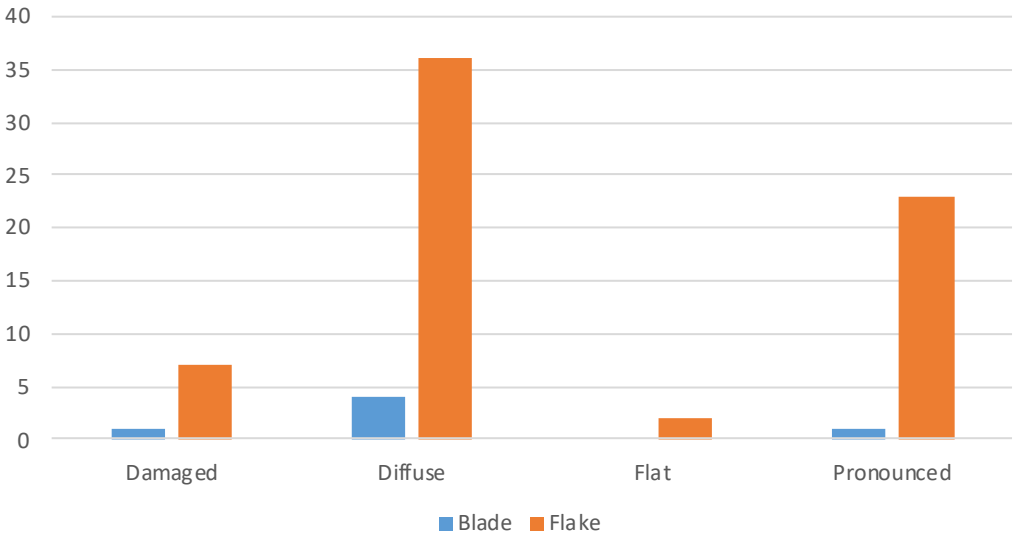


Figure 43: Complete blades and flakes quantified by their bulb of percussion type.

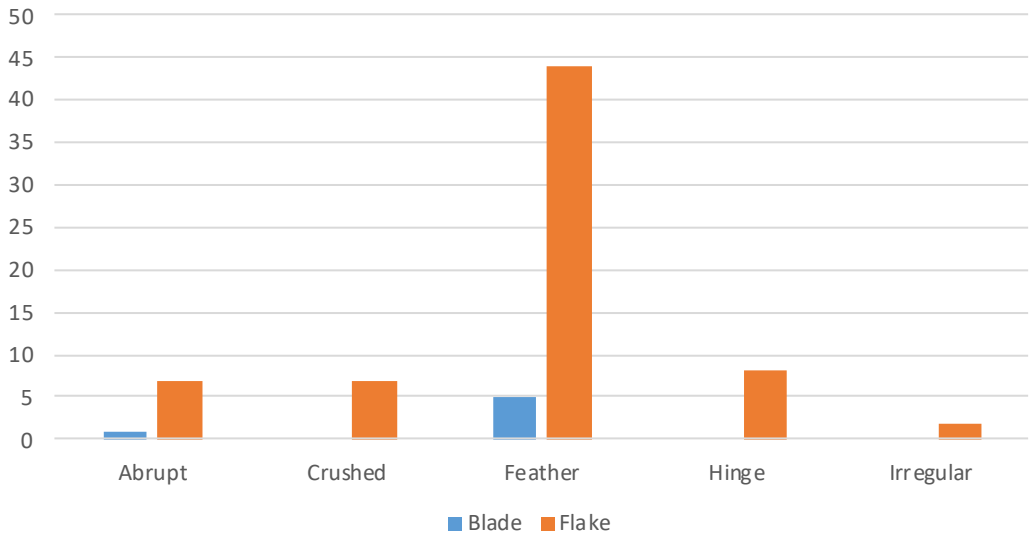


Figure 44: Complete blades and flakes quantified by their termination type.

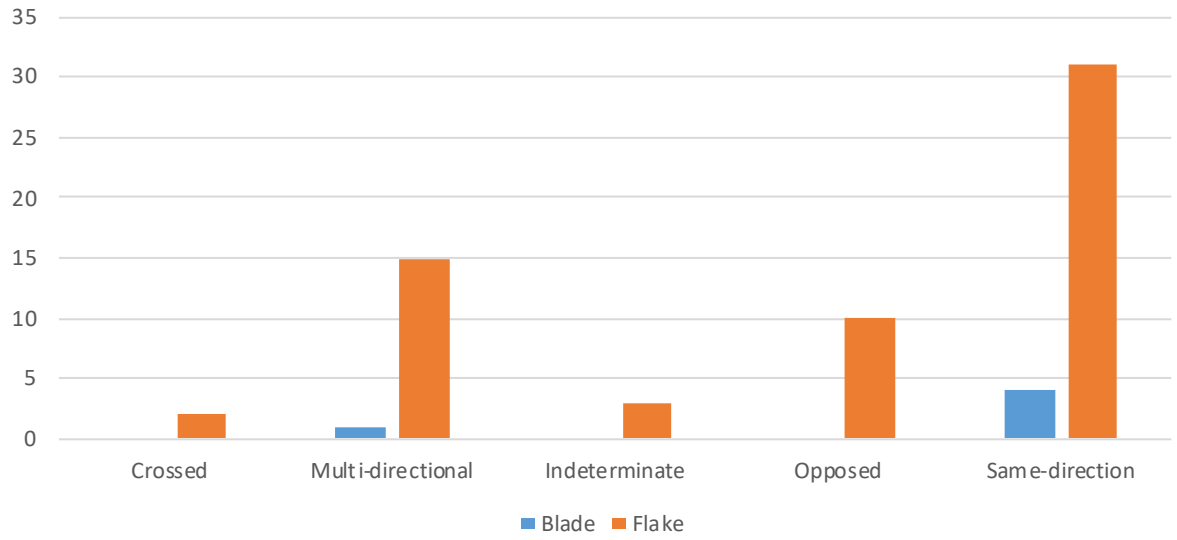


Figure 45: Complete secondary and tertiary blades and flakes quantified by negative dorsal scar orientation.

Flakes (pieces with a length/breadth ratio of less than 2.00, Figure 39) are much more common than blades and dominate the identifiable debitage blanks (Table 6). The majority are made from flint (92% of all flakes) and they are likely to be derived from the reduction of pebble flint. A smaller number (6% of all flakes) have been struck from nodules of quartz, whilst a few have been classified with indeterminate lithology. In regards to the latter, two pieces are heavily burnt and probably represent flint, two pieces are possibly chert, and one flake could be made from chalcedony/jasper.

The majority of the flakes are fragmented with only 68, with dimensions >10 mm, intact. The detailed analysis of these pieces sheds some light on the character of technology across the site area. Firstly, it is clear that very few cortical flakes from the early stages of reduction are represented, whilst pieces from the intermediate and latter stages are almost equal in number (Figure 40). This is of note as usually tertiary flakes -those without any cortex- dominate flaked lithic assemblages. The reasons for this are unclear, although there are significant numbers of broken pieces from probable tertiary flakes within the fragmented component of the assemblage. Additionally, bipolar reduction appears to have been frequently used during knapping (see below), and it is possible that a high incidence of fragmentary pieces was generated using such a reduction strategy. Furthermore, given the extent of the site, it is also clear that the excavated areas and their associated artefacts constitute a small proportion of stone working activity at the site and this may have skewed numbers.

The analysis of flake platform morphology shows that although the majority were plain and flat, there are also several that still retain cortex, and a similar number which had been crushed during reduction (Figure 41). The latter could further emphasise the significance of bipolar reduction during stone working. In addition, several of the flakes with plain platforms exhibited platform features consistent with a hard hammer technology such as incipient cones, fissures and ring cracks and it is likely that some of those pieces are associated with bipolar reduction, particularly the quartz flakes (Ballin 2008). In terms of platform preparation only a small number of flakes have had their platforms prepared prior to their removal (Figure 42). Moreover, a significant number of the flakes have pronounced bulbs of percussion (Figure 43), which strengthens the argument for hard hammer use during reduction, although, that said more items are associated with diffuse bulbs. It is generally accepted that bulb size relates to the types of hammer used during reduction, whereby pieces with pronounced bulbs of percussion are associated with a hard hammer technology, and those with diffuse/flat platforms represent a soft hammer use (Butler 2005, 37). However, it appears that such a clear-cut bipartite reading of the evidence is not the case and a range of other technological attributes, possibly derived from hard hammer use, should be considered in order to gain a fuller picture of hammer types used

during reduction. In that respect, across the flakes with pronounced and diffuse bulbs of percussion alike, flakes with an irregular morphology, gull wing platforms, thick platforms, crushed platforms and pieces representing probable miss-hits are relatively frequent, suggesting that hard hammer use was indeed dominant. In addition, it should be noted that the few flakes with damaged bulbs of percussion (Figure 43) are invariably associated with crushed platforms and in that respect appear to present clear evidence for bipolar reduction.

The record of distal terminations indicates a predominance for flakes with feathered types (Figure 44). This indicates that a measure of control and skill was practised by those working stone, even when using hard hammers. The flakes with abrupt, crushed, hinge and irregular terminations, often exhibit a range of attributes associated with bipolar reduction, or have impurities within the raw material. It is of note that quite a few of these pieces are from the secondary stage of the reduction process when the use of the platform on anvil reduction technique is more likely to have been applied in order to open up pebbles. Finally, the analysis of dorsal scar direction indicates that the majority of the flakes were removed uni-directionally from cores and nodules (Figure 45). There are relatively high numbers of flakes with multi-directional flake scars suggesting that the parent nodule may have been worked from different directions during reduction and this is often undertaken to maximise the potential of cores and nodules. It is possible that some of these pieces relate to a late Neolithic technology. Those with opposed dorsal scars are fewer, but possibly indicate an alternative approach to reduction beyond uni-directional flaking, although some, given the short and irregular character of the dorsal scars, undoubtedly relate to bipolar reduction.

In terms of size and morphology the majority of the flakes are relatively small and squat in form (Table 7, Figure 39). The exceptions are primary flakes, those which relate to nodule preparation and the opening up of pebbles, and they tend to be of much larger dimensions. There is also a relatively large amount of indeterminate chunks and fragments within the assemblage (Table 6). The latter represent thin and often small pieces of worked flint and stone which are unidentifiable fragments of heavily fractured blade and flake debitage and most likely indicate where stone working took place. Similarly, the chunks are more likely to reflect indeterminate shatter which was probably produced during stone working activity.

Secondary technology

Blades and flakes with secondary modification comprise a small and restricted range of tool types (Table 6). The projectiles include a leaf-shaped form (SF 2013-0029a, (Figure 46), a chisel form (SF 2012-0165a, Figure 46) and a possible blank for a leaf-shaped arrowhead (SF 2012-0159a). The leaf-shaped arrowhead is broken in two. It has invasive, sub-parallel retouch, almost ripple like in places, applied across both faces. It is pointed at either end of the long axis and the more attenuated point has steep concave sides but at the opposite end the sides are at a less steep angle (Figure 46). In terms of morphology the piece is a possible Green's type 2c/3c (1980). The probable chisel arrowhead is made on a flake struck from a Levallois type core (see Ballin 2011). Although, in the strictest sense, the piece is not retouched, one of the lateral edges (proximal) is faceted, which would have been applied when the flake was still attached to the core. The cutting edge is formed by a partial dorsal scar and the other lateral edge has edge damage (Figure 46). The possible leaf blank has semi-acute, inverse retouch on the right lateral edge and possible retouch on the same edge on the opposite face. The piece could represent the initial stages of producing a leaf-shaped arrowhead, or, alternatively, a small knife form.

One of the awls comprises an irregular flake with pointed distal spurs, one of which has been modified to form a point (SF 2012-0152b, Figure 46). It is of note that this piece is made on different type of flint to the rest of the assemblage and its technological character suggests that it is of a late Mesolithic or early Neolithic date. The other piece (SF 2013-0024b) is a probable awl, however, in places the retouch style is also reminiscent of a scraping edge and the implement could be a combination tool. A more convincing combination tool (SF 2015-0067a, Figure 46) is formed by abrupt retouch on the left lateral edge and semi-abrupt on the opposing edge. The latter follows the edge round onto the

distal end to form a retouched spur where they meet and hence the tool is probably a knife/awl. It also has probable edge use gloss on the ventral face on the right lateral edge (Figure 46). A flake, with a broken distal terminal, has possible micro-denticulation applied to a lateral edge (SF 2011-0001e), although the retouch could represent edge damage as the piece has extensive evidence for such across its other edges (Figure 46). The knife form comprises a section of a broken blade which has semi-abrupt retouch on the right lateral edge (SF 2013-0007s, Figure 46).

Scrapers represent the most common tool type associated with the assemblage (Table 6). On the basis of retouch style and location they can be classified as one double sided scraper (2013-0003a), seven end scrapers (SF 2011-0001a Figure 46, SFs 2011-0002f, 2011-0118a, 2014-0005a), two irregular forms (2013-0004k, Figure 46), one side scraper (2011-0007b, Figure 46), and two side and end forms (SF 2014-0001a, Figure 46). Nine of the scrapers are complete and the majority are made on primary and secondary flakes, and all show evidence for extensive use in the form of small irregular scarring along the objective edge. It is of note that several are made on flakes which exhibit technological traits associated with bipolar reduction. This is borne out by one of the end scrapers, which is made on either a bipolar core or flake (SF 2011-0002f). The majority of the scrapers show technological affinities consistent with a late Neolithic/Bronze Age date, although at least two could be of a Mesolithic technology (SFs 2011-0001a and 2011-0002f).

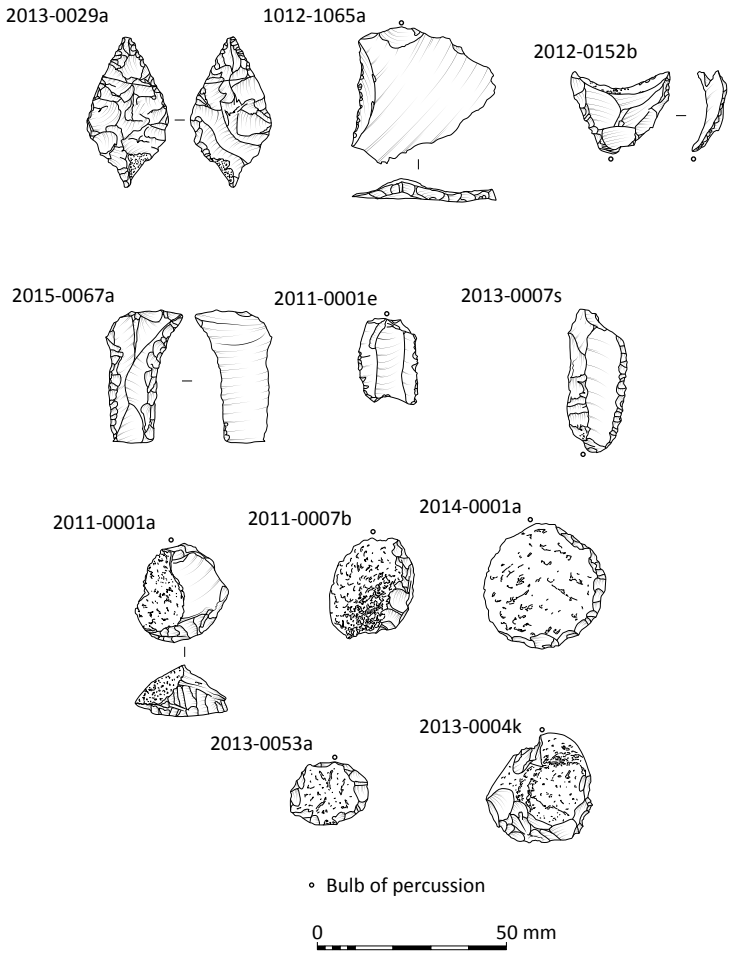


Figure 46: Lithics 2013 0029a - a leaf-shaped arrowhead; 2012 0165a - a chisel form projectile; 2012 0152b - awl; 2015 0067a - combination tool; 2011 0001e - flake with micro-denticulation; 2013 0007s - knife blade; the remainder are scrapers

Coarse stone tools

The coarse stone tool component of the assemblage consists of two forms: rubber/grinders and hammerstones, though, one piece exhibits wear traces associated with both classifications. The definite hammerstone has concentrated areas of pecking on both ends of the cobble. One end has more extensive evidence for use defined by the depth of the pecking and use damage (SF 2015-0071a, Figure 47).

The three rubbers include two broken pieces and a complete specimen. The latter has distinctive worn areas across it surface (SF 2015-0090a), whilst on the fragments the worn areas are less well defined and it is possible that they are not utilised. The rubber/hammerstone has a concentrated area of pecking on one face at the end of the cobble and the other face has a smoothed and worn appearance indicating that it was also utilised as a rubber/grinder (SF 2015-0089a).

Spatial distribution

Cairn 103 (Season 2014 - Trenches 26 and 27, Season 2015 - Trenches 30 and 31, Figures 3 and 6).

A reasonable assemblage of worked stone was recovered from the excavation of Cairn 103 (Table 8). Contexts (2602, 2603 and 2607) in Trench 26 produced the only blade from the whole Cairn 103 assemblage, five flakes, and an indeterminate chunk. The majority of the lithics were made from pebble flint. Along with those is a flake made on material with indeterminate lithology, and an indeterminate chunk of rock crystal. The blade is a proximal fragment and there is sufficient remaining to imply that it was probably representative of a late Mesolithic or early Neolithic technology. Only two flakes are complete, and they represent secondary and tertiary pieces. One flake displayed attributes consistent with it being produced during bipolar reduction, whilst a second piece had platform features reminiscent of being struck with a hard hammer. Three flake fragments were burnt and two of those were derived from context (2602).

Lithic type	Number of lithics
Blade	1
Coarse stone tool	4
Combination tool	1
Flake	16
Indeterminate chunk	6
Indeterminate fragment	2
Scraper	1
Total	31

Table 8: Quantification of the worked stone assemblage associated with Cairn 103.

Contexts (2701, 2703, 2704 and 2706) in Trench 27 produced an end scraper, five flakes, three indeterminate chunks, and two indeterminate fragments. The use of pebble flint is prevalent among the worked stone, although an indeterminate chunk with indeterminate lithology is also recorded, and a flake and an indeterminate chunk of milky quartz were recovered from context (2706). Three flakes are complete and they represent two primary and one secondary removals. Five lithic pieces are burnt and are associated with contexts (2701, 2704 and 2706). The end scraper was produced on the proximal end of a probable primary, bipolar flake.

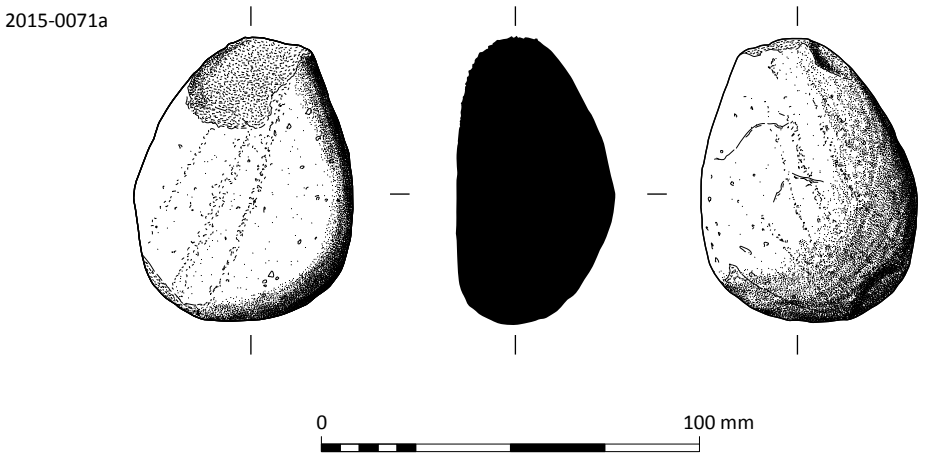


Figure 47: Hammerstone.

Trench 30 produced a rubber/grinder cobble tool and a milky quartz indeterminate chunk, which were all recovered from context (3016). Contexts (3101 and 3105) in Trench 31 produced three coarse stone tools, the combination tool, six flakes and an indeterminate chunk. The majority of the artefacts are made from pebble flint, apart from one of the flakes which is made from milky quartz. The coarse stone tools utilised a probable quartzite cobble and fragments thereof as supports. Four flakes are complete and they represent one secondary and three tertiary pieces. Four flakes were probably produced during bipolar reduction (two from each context), and a flake and a fragment of a coarse stone tool from context (3105) are burnt. A complete flake and a fragment have possible retouch on their lateral margins, and they are associated with context (3101). The combination tool was recovered from context (3105), which also yielded all of the coarse stone tools. They represent two fragments of possible rubbers/grinders and a complete hammerstone/grinder. It is of note that the coarse stone tools formed a cluster suggesting that they were intentional deposited.

Cairn 105 (Season 2013 Trench 11, Figures 3 and 7)

Trench 11 produced a broken flint flake and an indeterminate chunk of rock crystal, and both were derived from context (1105).

Cairn 105 linear extension (Season 2013, Trench 14, Figures 3 and 7)

A small collection of flaked lithics was recovered during the excavation of Cairn 270, which amounts to six flint flakes. All the flakes were associated with context (1401). Only two items were complete and they consist of a secondary and tertiary flake. The remainder represent two proximal fragments, a siret fracture and an indeterminate piece.

Cairn 270 (Season 2013, Trench 15 west of Cairn 105, Figures 8 and 9)

This trench yielded four flint flaked lithics from context (1501). They include a single platform core, a small flake, an indeterminate chunk, and the leaf-shaped arrowhead.

Enclosure (Season 2015 Trenches 32 and 33, Figures 3 and 13)

Excavation of the Enclosure yielded a small collection of worked stone. Context (3201) from Trench 32 produced the greater number of lithics including a bipolar core and three flakes all made from flint. Two of the flakes are complete and represent tertiary removals, and one displays evidence for platform preparation, which is rare amongst the debitage across the assemblage as a whole. Context (3211) yielded a probable quartzite cobble, which had been used as a hammerstone. Context (3301) from Trench 33 produced a milky quartz flake fragment and indeterminate fragment. The same trench also yielded a heavily burnt flake fragment of indeterminate lithology from context (3306).

Hut Circle 5 (Season 2011, Trenches 1 and 2, TPs 1-15, Figures 4, 14 and 15)

This feature produced a large assemblage of flaked lithics from contexts associated with two trenches and several test pits (Table 9). A blade fragment made from possible chalcedony/jasper, which is a distinctive red colour, was recovered from context 100 in Trench 1. Interestingly a flake fragment from Trench 2 is also made from the same raw material. Contexts (103, 109 and 114) yielded five pebble flint flakes from the secondary stage of the reduction sequence, of which four had probably been produced during bipolar reduction. In addition, a flint flake fragment was recovered from context (108).

Lithic type	Number of lithics
Blade	2
Core	1
Denticulate	1
Flake	24
Indeterminate chunk	4
5,	5
Scraper	3
Total	40

Table 9: Quantification of the flaked lithic assemblage from Hut Circle 5.

Context 200 from Trench 2 also yielded a further six flaked lithics comprising three more flakes, an end scraper, a side scraper and a flake with micro-denticulation applied to a lateral edge. A complete flake and a flake fragment both display attributes consistent with them having been produced during bipolar reduction. Context (208) yielded three flakes and an indeterminate fragment. Two flakes and the indeterminate

fragment were produced during the reduction of milky quartz, whilst the other flake was made from pebble flint. This item had a crushed platform and a deep opposed flake scar on the distal end indicating that it too was probably produced during bipolar reduction. A further quartz flake was recovered from context (218), whilst an indeterminate pebble flint fragment came from context (207). It is of note that a relatively large number of tools were recovered from this trench.

Beyond the trenches excavated across the hut circle flaked lithics were recovered from several test pits excavated within the immediate environs of the feature. TP 1, located to the south-east of the hut circle, produced the largest assemblage of flaked lithics, which were all made from pebble flint, and four were burnt. The assemblage includes a single platform blade and flake core, five flakes, two indeterminate chunks, two indeterminate fragments and an end scraper. The single platform core was worked using bipolar reduction evidenced by crushing at the platform and base, which are both characterised by irregular flake scars and incipient cones. Two of the flakes are complete and they represent a secondary and tertiary removal. Interestingly at least two of the flakes were probably produced during bipolar reduction and they could be associated with the core. Alongside those, the support for the end scraper also displays attributes associated with bipolar reduction.

A further five test pits (3, 6, 7, 12 and 15) produced flaked lithics. These primarily comprised single items of pebble flint debitage, several of which were probably produced during bipolar reduction. The exception was TP 15 which yielded four items and it is of note that it was located to the south of TP 1. In terms of distribution the rest of the material was scattered across the wider area defined by the location of the test pits.

Hut Circle 17 (Season 2011, Trenches 3 and 4, TPs 100-113, Figures 4, 18 and 19)

The excavation of this hut circle produced another fairly large flaked lithic assemblage (Table 10). Context (302) from Trench 3 produced an indeterminate flint fragment, whilst the proximal end of a flint blade was recovered from context (303). The indeterminate fragment could be from a bipolar core, and the blade butt end has several incipient cones indicating that it was probably produced during hard hammer and/or bipolar reduction. Trench 4 yielded a small collection of flint flaked lithics including a flake fragment, an indeterminate chunk and fragment, and a small flake (dimensions <10mm). The indeterminate chunk and the small flake are burnt, and the flake fragment, although not burnt itself, has a possible charred residue adhering to one face.

Lithic type	Number of lithics
Blade	2
Flake	18
Indeterminate chunk	10
Indeterminate fragment	5
Scraper	4
Total	39

Table 10: Quantification of the flaked lithic assemblage from Hut Circle 17.

By far the largest collection of flaked lithics was recovered from TP 108, which includes three indeterminate chunks, a similar number of indeterminate fragments and eight flakes. All the items are made from pebble flint apart from one flake fragment which is rock crystal. Four flakes are complete and they represent two primary, one secondary and a tertiary removal. Additionally, three flakes are burnt including the quartz fragment. A smaller assemblage of worked pebble flint was recovered from TP 109, which consists of a blade fragment, a burnt indeterminate chunk, two small flakes and an end scraper made on a primary flake. In addition, TP 110 yielded a slightly larger assemblage which consisted of four indeterminate chunks and three flakes. All the material from the latter two test pits represents the reduction of pebble flint apart from one of the chunks which is made from material with indeterminate lithology, however, that piece is burnt. Notably four other items are burnt too. Two flakes are complete and they represent secondary and tertiary removals. It is possible that the flaked lithics recovered from TPs 108-110, which lay adjacent to one another, represent elements of a larger lithic scatter.

A small assemblage of worked pebble flint was recovered from TP 111, to the south-east of the hut circle, and they consist of two end scrapers and a flake fragment. The scrapers are made on

primary and secondary flakes which have crushed platforms indicating that they were possibly removed during bipolar reduction. It is of note that TP 103, which was located immediately to the north-west, also produced a side and end scraper, which is made on a hard hammer struck flint flake.

Hut Circle 18 (Season 2013, Trenches 9, 10 and 12, TPs 101-113, Figures 4, 20 and 21)

The largest assemblage from the excavations was recovered from the trenches and test pits associated with the excavation of Hut Circle 18 and its immediate environs (Table 11). Context (901) from Trench 9 produced three indeterminate fragments, two flakes, and a double side scraper, whilst context (905) yielded two small flakes. Only one flake is intact and it represents a secondary removal and an indeterminate fragment is burnt. All the items are made from pebble flint and the scraper is made on a small primary flake. Also, one of the small flakes has a faceted platform which could relate to a form of platform maintenance. A similar attribute has been identified on flakes from a late Mesolithic site in northern Britain (Brown *et al.* in prep).

Lithic type	Number of lithics
Awl	1
Blade	4
Core	5
Flake	37
Indeterminate chunk	7
Indeterminate fragment	8
Knife form	1
Flaked pebble	7
Scraper	4
Total	74

Table 11: Quantification of the flaked lithic assemblage from Hut Circle 18.

Trench 10 produced a significantly larger collection of flaked lithics with the majority derived from context (1001). They included the bipolar core made on recycled flint, an indeterminate chunk, seven flakes and three scrapers, which, apart from a milky quartz flake fragment, were all made from pebble flint. Only two of the flakes were complete and they represent two secondary removals, of which one was burnt. Several of the flakes exhibit attributes consistent with them having been produced during bipolar reduction. The scrapers represent an end form and two irregular items. The end scraper was made on a primary bipolar flake, whilst the irregular pieces possibly represent modified cores. Context 1002, from the same trench, yielded two flake fragments, one of which was made from rock crystal.

Trench 12, which was located to the north of Hut Circle 18, produced a notable assemblage of pebble flint cores and flaked pebbles from context (1204). The two cores were of a similar technology whereby they represent split flint pebbles which have been flaked from their edges in a manner similar to the reduction of disc cores. The flaked pebbles had been split using bipolar reduction and some had been subsequently flaked. Two pieces could be refitted. Test pit 104, located to the south of the hut circle produced a large collection of flint debitage, although a quartz indeterminate chunk was also present. The assemblage included two blades, six indeterminate chunks and fragments, 10 flakes and a probable knife. The two blades are broken and represent distal fragments. Six of the flakes are intact and they represent a secondary and five tertiary removals. At least four of the flakes exhibit evidence for having been produced during bipolar reduction. The knife is made on a large blade and is possibly representative of a late Neolithic/Bronze Age technology.

Nearly all of the other test pits associated with the excavation of Hut Circle 18 produced at least one item of worked stone. Most of this material consists of pebble flint debitage, although several artefacts stand out from the rest. For example, a burnt flint blade fragment and a flint indeterminate fragment were recovered from TP 101. The dorsal morphology of the broken blade indicates that it was probably produced during systematic blade production and could represent a late Mesolithic or early Neolithic technology. In addition, two cores were recovered from TP 111. One item is a flint bipolar core, which is finely worked in contrast to other similar forms and could also be representative of a late Mesolithic or early Neolithic technology, whilst the other is probably a core on a flake. Finally, TP 110 yielded an awl which could be late Neolithic/ Bronze Age in date. The presence of these lithic artefacts suggests that the worked stone lying within the environs of Hut Circle 18 is of a mixed technological and chronological character.

Hut Circle 19 (Season 2012, Trenches 7 and 8, TPs 220-231, Figures 4, 22 and 23)

A smaller assemblage was derived from the excavation of Hut Circle 19 which consists of two blades, 14 flakes and five indeterminate fragments. All the pieces are made on pebble flint, apart from one of the indeterminate chunks which is made from rock crystal, and three items are burnt. In terms of distribution Trenches 7 and 8 and TPs 220, 222 and 227 produced between one and two pieces of flint debitage. TP 221 produced two flakes one of which is a thermal removal, whilst the other is a secondary piece. A blade fragment and the quartz indeterminate fragment were also recovered from the same test pit. Six flakes were associated with TP 226. Three items were complete and represent a secondary and two tertiary removals. Three more flakes and two indeterminate fragments were recovered from TP 231. In this instance one flake is a chip whilst the other two pieces are broken.

Hut Circle 28 (Season 2012, Trenches 5 and 6, TPs 201-216, Figures 4, 24 and 25)

A relatively large assemblage was recovered from the trenches and the test pits associated with the excavation of Hut Circle 28 (Table 12). Context (501) from Trench 5 produced three indeterminate chunks of quartz, a flint tertiary flake and an awl made on a flint flake. The quartz chunks could be natural pieces as there are no clear signs for any of them having been intentionally flaked. The same trench produced a chisel arrowhead of a probable late Neolithic date, and an indeterminate chunk and a flake fragment that were all made from flint. A much smaller collection of flint debitage, comprising a burnt indeterminate fragment and a flake fragment, were recovered from context (601) in Trench 6.

Lithic type	Number of lithics
Arrowhead	2
Awl	1
Blade	3
Flake	36
Indeterminate chunk	9
Indeterminate fragment	10
Total	61

Table 12: Quantification of the flaked lithic assemblage from Hut Circle 28.

Three test pits produced reasonable sized assemblages of worked flint and quartz. TP 212 yielded a possible blank for a leaf-arrowhead, six broken flakes and three indeterminate fragments. All of the artefacts were made from flint apart from one of the indeterminate fragments which was made from milky quartz. Additionally, only one piece, one of the indeterminate flint fragments, was burnt. A large assemblage of flint debitage was recovered from TP 214. This included two blades, 19 flakes, and nine indeterminate chunks and fragments. The two blades are complete and represent two tertiary pieces, which were produced during bipolar reduction. The flakes included eight examples which were complete and two chips. The complete flakes represent five secondary and two tertiary removals. One of the flakes was of relatively large dimensions and this suggests that it might not be made from pebble flint. However, it bore attributes associated with bipolar reduction. Three other items also showed signs of being worked using the same reduction strategy. Five flakes and three indeterminate fragments and chunks were burnt. Finally, TP 215 also produced a relatively large collection of flint debitage consisting of five flake fragments, a small flake, and two indeterminate pieces. Interestingly only three flake fragments did not show signs of having been burnt. The remainder of the test pits (202, 204, 213 and 216) produced a single artefact each, and all consisted of pieces of pebble flint debitage.

Hut Circle 29 (Season 2014, Trenches 20, 21 and 27, TPs 701 -708, Figures 4, 26 and 27)

The trenches and test pits associated with the excavation of Hut Circle 29 produced a relatively large assemblage of flaked lithics comprising three blades, one core, 22 flakes, six indeterminate fragment and chunks and a scraper. The majority of the lithics were produced during the reduction of pebble flint nodules, apart from two flake fragments whose lithology could not be determined. The latter appear to represent the same raw material, which could be a chert, but they were also burnt.

Context 2001 from Trench 20 produced a burnt pebble flint flake fragment and a side and end scraper, manufactured on a pebble flint primary flake, which is reminiscent of a Neolithic/early Bronze Age technology. Context 2003 yielded the

two burnt possible chert flake fragments and a pebble flint flake fragment, which was also burnt. Trench 21 also produced a small collection of lithics comprising a core and a tertiary flake from context 2103, and a primary flake from context 2104. All the items were made on pebble flint and the flake from 2104 displayed evidence for having been produced during bipolar reduction. The core was made on a flake from a flint pebble. Two lithics including a flake and a blade like flake, both of which were derived from bipolar reduction, were recovered from context 2702 in Trench 27.

Only three test pits yielded flaked lithics. Two (701 and 706) produced three flakes and fragments thereof between them. The largest assemblage was derived from Test pit 708 and consisted of two blades, 12 flakes and six indeterminate chunks and fragments. The blades included a tertiary piece which could be a true blade associated with late Mesolithic or early Neolithic stone working traditions. Similarly, only one of the flakes was complete and that was a secondary piece which was worked with a hard hammer. Two of the broken flakes were burnt, as were three of the indeterminate pieces.

Discussion

The nature of the excavation, sample trenches and test pits, means that only elements of lithic reduction sequences was recovered. This has undoubtedly restricted our understanding of the overall composition and spatial distribution of stone working activity at Balbithan. That said, the Balbithan worked stone assemblage does allow some insight into the procurement, production and use of flaked lithics and coarse stone tools at the site.

Raw materials, predominantly consisting of flint pebbles were apparently brought to the site and subjected to bipolar reduction in order to split them. The collection of split pebbles from Trench 12 (Cairn 271), adjacent to Hut Circle 18, of which two items refit, is testament to this. It is evident that in other areas of the site split pebbles formed the basis for core production, and in some instances these were flaked systematically from single platforms with hard hammers. Other examples display attributes indicating that they were worked using bipolar reduction, and one item is of small dimensions and has technological parallels with cores flaked using a comparable technology in the late Mesolithic (Brown *et al.* in prep). Also, there is slight evidence to indicate the recycling of previously worked flint nodules. These often displayed diagnostic attributes relating to earlier stone working traditions and a less systematic reduction strategy. Additionally, some chunks were partially flaked in the production of a few flakes.

Very few blades appear to have been produced during core reduction. Although among those recorded several exhibit traits associated with a late Mesolithic or early Neolithic blade technology. However, the bulk of the blades are of relatively large dimensions and show clear attributes for being produced uni-directionally from cores using a hard hammer technology and/or bipolar reduction. The bulk of the flakes were also produced using similar reduction strategies.

Evidence for bipolar reduction is particularly notable and it is spread across the excavation areas suggesting that the reduction technique was commonly employed across the site area. The same reduction strategy is probably associated with the working of quartz too. The exception is the assemblage recovered from trenches and test pits associated with the excavation of Hut Circle 17 where the evidence for bipolar reduction is notable by its relative absence.

The blades and flakes subjected to secondary modification are dominated by scrapers which have late Neolithic/Bronze technological affinities. Alongside these are a range of other tools that are also probably late Neolithic in date. For example, the broken leaf-shaped arrowhead has parallels with similar items recovered during excavations at Kintore (Engl 2008, 233). The fact that this item is broken is of note, although it cannot be ascertained whether this was done intentionally or happened post-deposition. However, given its depositional context and the fact that the de-commissioning of other types of flint tools has been recorded elsewhere (Alexander 2000, Engl 2008), intentional breakage is a distinct possibility. Additionally, the support for the chisel arrowhead produced on a Levallois type core (see Ballin 2011), is a technology which has an affinity with late Neolithic Grooved ware pottery traditions.

Coarse stone tools are relatively rare at Balbithan. Nevertheless, one item is associated with the Enclosure. This feature produced a radiocarbon date for the middle of the first half of the fourth millennium cal BC. The other four cobble tools were associated with Cairn 103. In this instance radiocarbon dating indicates the cairn probably dates to the middle of the fifth millennium cal BC. The wear traces on the cobble tools suggest that the piece associated with the Enclosure was possibly used in stone working activity, or related tasks. The wear traces on the majority of the other cobble tools, associated with the cairn, suggest they had been used in processing raw materials, probably of an organic nature.

The bulk of the flint and coarse stone tools have chrono-technological similarities with the radiocarbon dates associated with the excavated structures, as for that matter does the technological attributes of the primary flaked lithic technology. However, in most cases it is difficult to attribute the collections of flaked lithics directly with activity at a specific structure, and in most instances where they occur in significant quantities they often comprise elements of several technologies. Nevertheless, a consideration of the spatial association of significant lithic assemblages with excavated structures, particularly the hut circles, and the rare coincidence of similar raw material types suggest that they could be related.

In relation to the latter, the two quartz flakes recovered from Trench 33, during the excavation of the Enclosure, are likely to have been struck from the same nodule, whilst three pieces of the same material from Hut Circle 5 could also represent elements of in situ reduction. In addition, the probable blade and flake fragments made from chalcedony/jasper, from the excavation of the same hut circle, could also be from the same core. At Hut Circle 18, Trench 9 produced three lithic items, including a double end scraper, all of which were made on the same type of raw material.

It is of note that the largest collections of flaked lithics were derived from interventions associated with the excavation of hut circles, whilst those associated with the cairns and the Enclosure produced relatively smaller assemblages. This observation appears to indicate that the material could derive from activities undertaken within and around the structures. However, by contrast there were only low level of lithics recovered from the excavated contemporary roundhouses at nearby Kintore (Engl 2008) and this may argue that a large proportion of the lithics are residual.

The largest assemblage is associated with Hut Circle 18 and includes at least one interesting cluster of flaked pebbles and cores, however, the same structure was also associated with a significant volume of Neolithic pottery (see *Prehistoric pottery*) and it is not clear that it is in fact a domestic structure. Some support for this contention derives from the collection of split flint pebbles produced during bipolar reduction, several of which were subsequently flaked from Cairn 271. The presence of two refitting pieces implies that the pebbles had been knapped close to where they had been deposited. Moreover, the fact that they represent a homogenous group of lithic types indicates that they could have been intentionally selected for deposition as indeed does the presence of the surrounding cairn.

Additionally, several other excavation areas produced significant collections of worked stone. For example, TP 104 associated with Hut Circle 18 contained a relatively large assemblage of debitage which possibly indicates stone working activity within the vicinity of the structure. TP 214 adjacent to Hut Circle 28 yielded a large amount of blade, flake and indeterminate debitage, some of which exhibited evidence for the use of bipolar reduction. Interestingly TP 27 associated with Hut Circle 29, produced an assemblage of mainly grey flint along with quite a few burnt lithics. The presence of the grey flint indicates that there is potentially some integrity to the assemblage. In addition, most pieces were relatively small in dimensions in comparison to material from elsewhere across the site area. Finally, the occurrence of a similar repertoire of debitage and tools, particularly scrapers, is of note at Hut Circles 5, 17 and 18.

Within a regional context the lithic assemblage recovered from Balbithan adds to a growing body of evidence for stone working activity at sites with a strong Neolithic and/or Bronze occupation sequence. Excavations at Kintore

produced a significant flaked lithic assemblage which included evidence for the application of hard hammer and/or bipolar reduction strategies in domestic and ritualistic contexts. Much of this material was recovered from a variety of features dating from the Neolithic and Bronze Age periods. The domestic element comprised an expedient flake-based industry provisionally dated to the late Neolithic and Bronze Age (Engl 2008). During excavations along the route of the Kintore and Blackburn Bypass a lithic assemblage predominantly recovered from the site at Deer's Den included evidence for bipolar reduction, although flake production from single platform cores was apparently more common (Alexander 2000). The lithic assemblage was chiefly recovered from Neolithic pits and a Middle Bronze Age structure. Further afield at Peterhead, Neolithic artefact scatters and Bronze Age structures were excavated during the construction of a gas pipeline. Here the lithic assemblage was flake-based, and was produced using hard hammer and /or bipolar reduction strategies, although in this instance it appears that bipolar reduction was more common, particularly in proximity of two of the structures (Strachan and Dunwell 2003). At Blackdog, near Aberdeen, a lithic assemblage, recovered during a watching brief, included a large number of bipolar cores, flakes and a few diagnostic tools, dominated by scrapers. In this instance no sub-surface features were associated with the lithic material, but the technological analysis of the assemblage indicated that it mainly comprised later prehistoric material, most likely dating to the late Bronze Age (Ballin *et al*. 2017, 10).

Prehistoric pottery

Ann MacSween

Prehistoric pottery was recovered from five of the 15 sampled structures (Hut Circle 05, Hut Circle 18, Hut Circle 19, the Enclosure and Cairn 103). The pottery is broadly typical for the area and similar to that recovered from the Kintore Excavation (MacSween 2008). The pottery from Hut Circle 05, which comprised body sherds from prehistoric pots, is not included in this report. A catalogue of sherds described here is presented in Appendix 2.

Hut Circle 18

Fifteen sherds and crumbs were recovered from four contexts (1005, 1001, 1002 and 902).

The largest sherd (SF 27, context 902) is from an undecorated carinated vessel, probably a bowl from its profile. It has a short neck and a rim with a slight internal bevel. It has around 40% of crushed rock and has been given a wet-hand smoothing on the exterior. The exterior surface is sooted, especially above the carination.

The dating of carinated bowl pottery was summarized by Sheridan (2007, 451-8, figure 6) who concluded that traditional carinated bowl pottery was in widespread use in north-east Scotland by at least 3900 BC. The possibility that round based bowls continued in use in the north-east of Scotland alongside impressed wares was suggested from the dates for the carinated bowl assemblage from Forest Road, Kintore, Aberdeenshire which spanned 3970 to 2880 cal BC (Cook and Dunbar 2008, 167-70), a possibility raised previously by the recovery of both Carinated Bowl pottery and Impressed Ware pottery from pits at Dubton Farm, Angus (MacSween 2002, 39).

Two rim sherds from contexts 1005/1001 (SF 17) and 1002 (SF 13) are from an impressed ware bowl. The rim has an interior bevel decorated with two lines of impressed twisted cord pressed deeply into the flat part and running round the circumference of the rim. Below the lip of the rim on the exterior is a line of horizontally placed fingernail impressions.

Until relatively recently, impressed wares were thought to date to the early to mid-third millennium BC. Sheridan (1997) suggested the possibility of earlier dates in the mid to late fourth millennium BC. A number of dates[11] for east coast assemblages, including Dubton Farm Angus (3639–3374 cal BC, AA-39948) (Cameron 2002, 68) and the Forest Road excavations at Kintore (3530–3340 cal BC, SUERC-1322) (Cook and Dunbar 2008, 181), have confirmed the earlier date for this type of pottery. Further discussion of the context and dating of impressed wares can be found elsewhere (e.g. MacSween 2007, 368-70).

Hut Circle 19

A single possible Neolithic abraded body sherd SF 184, context 809.

Enclosure

A single prehistoric rim fragment.

Cairn 103

184 sherds from an estimated 41 vessels were recovered from Cairn 103. Most of the sherds are similar in fabric and finish and probably belong to the same tradition of pottery manufacture. From the diagnostic sherds, the pottery is from an early Neolithic round-based assemblage, including both lugged bowls and round-based bowls decorated with impressed decoration. The dates for contexts in the cairn with pottery are 3800–3500 cal BC (see Table 13, *Radiocarbon dates*).

The profile of some of the vessels indicates that they were simple round-based bowls, SF 18, SF 12 (Figure 48), and SF 75 (Figure 49), curving into the base from below the rim. The profile of other vessels, for example, SF 74B (Figure 49), indicates a more complex profile, with the flared rim sweeping in to form a neck and then expanding again below a line of lugs to form the belly of the vessel.

A range of rim forms is included in the assemblage. SF 18 has a plain rim formed by adding a coil along the top of the formed vessel and folding it to the exterior. The coil has detached in this case, and it is suggested that vessel SF 73C (Figure 48) had a similar lip as the top coil is undulating which would be unusual in a rim. Similar rim forms were noted in SF 12 (Figure 48) and SF 75 (Figure 49), and SF 6 (Figure 48) is a small fragment of rim which has detached. Other rim forms are included – SF 74A (Figure 49) has a rounded, slightly tapered profile, SF 72A, SF 73B (both Figure 48), SF 74B and SF 78 are flared, and SF 87C (all Figure 49) has a slight interior bevel. Several of the vessels – 72B, 73C (both Figure 48), SF74A and 74B (both Figure 49) have lugs.

Decoration was noted on three vessels, in all cases finger-impressions. SF 12 (Figure 48) has deep finger impressions around the flat lip and in a line around the vessel below the lip. Similar decoration was noted on SF 75 (Figure 49). A finger impression was also noted on a body sherd (SF 25) (Figure 48). Combing noted on 87D may also represent decoration. Surfaces were finished by smoothing, scraping, or wiping.

Both sandy and fine sandy clays were used, usually with 10-20% of small rock fragments or coarser sand. Higher amounts of rock were noted in several vessels – 40% in SF 55, SF 69, SF 72B, SF 74A (Figure 49), SF 77 and SF 87C (Figure 49) and 30% in SF 54, SF 73C (Figure 48), SF 74B (Figure 49), and SF 74C.

Discussion

In a recent review, Sheridan (2016) outlines the chronology of Neolithic pottery from Scotland. She suggests that the earliest pottery in Scotland is represented by a round-based, bipartite vessel with a closed profile from Achnacreebeag, Argyll and Bute which is similar to Late Castellic pottery used mostly in the Morbihan area, south-east Brittany and she suggests was brought to Scotland, by a west coast maritime route, around 4300 to 3900 BC by immigrant Breton farmers (ibid. 189-90). The carinated bowl tradition she sees as deriving from a tradition of pottery-making found in the area of northern France closest to the south-east coast of England at around 4000 BC and introduced to Britain along the east coast although the Scottish distribution also shows concentrations in the west and south-west (ibid. 190-91) between 4000 and 3800BC (ibid. 190-91).

11 Quoted as 2 sigma

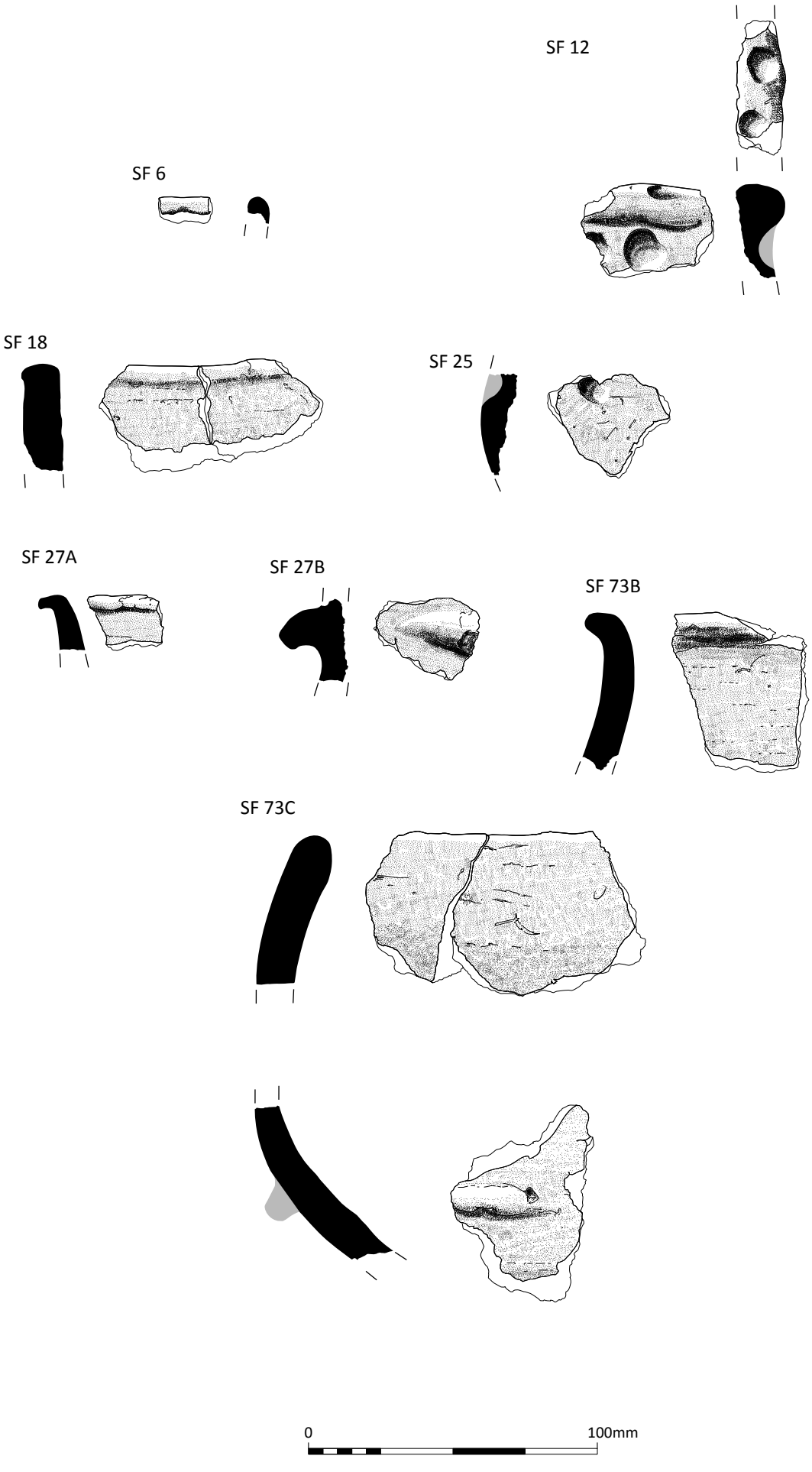


Figure 48: Pottery rims, with decorated sherds SF 12 and SF 25.

The pottery relating to this period of the Neolithic in Scotland includes a variety of forms, including vessels where the collar and bowl are of similar depth, examples where the collar is deeper than the bowl and examples where the bowl is deeper than the collar. Pottery in use at this time also includes uncarinated plain bowls and taller round-based vessels with a flaring rim. The rim types are usually plain upright forms or flared with a rounded or rolled lip (see Sheridan 2016, 191 fig 2 for a comparison of the main forms). Sheridan (1997, 219-20) has noted that it is likely that traditional carinated bowl pottery continued to be made and used throughout the first half of the fourth millennium BC. Alexander (2000, 40), in his discussion of the assemblage from Deer's Den, Kintore, noted that generally the north-east assemblages contain a mix of fluted carinated bowls and a few coarser carinated plain bowls. It is probable that within the general north-east style there are regional or local preferences (MacSween 2008, 179), seen, for example in the preference for long-necked vessels at Deer's Den (Alexander 2000) and the preference for shorter-necked vessels at Midtown of Pitglassie (Shepherd 1996).

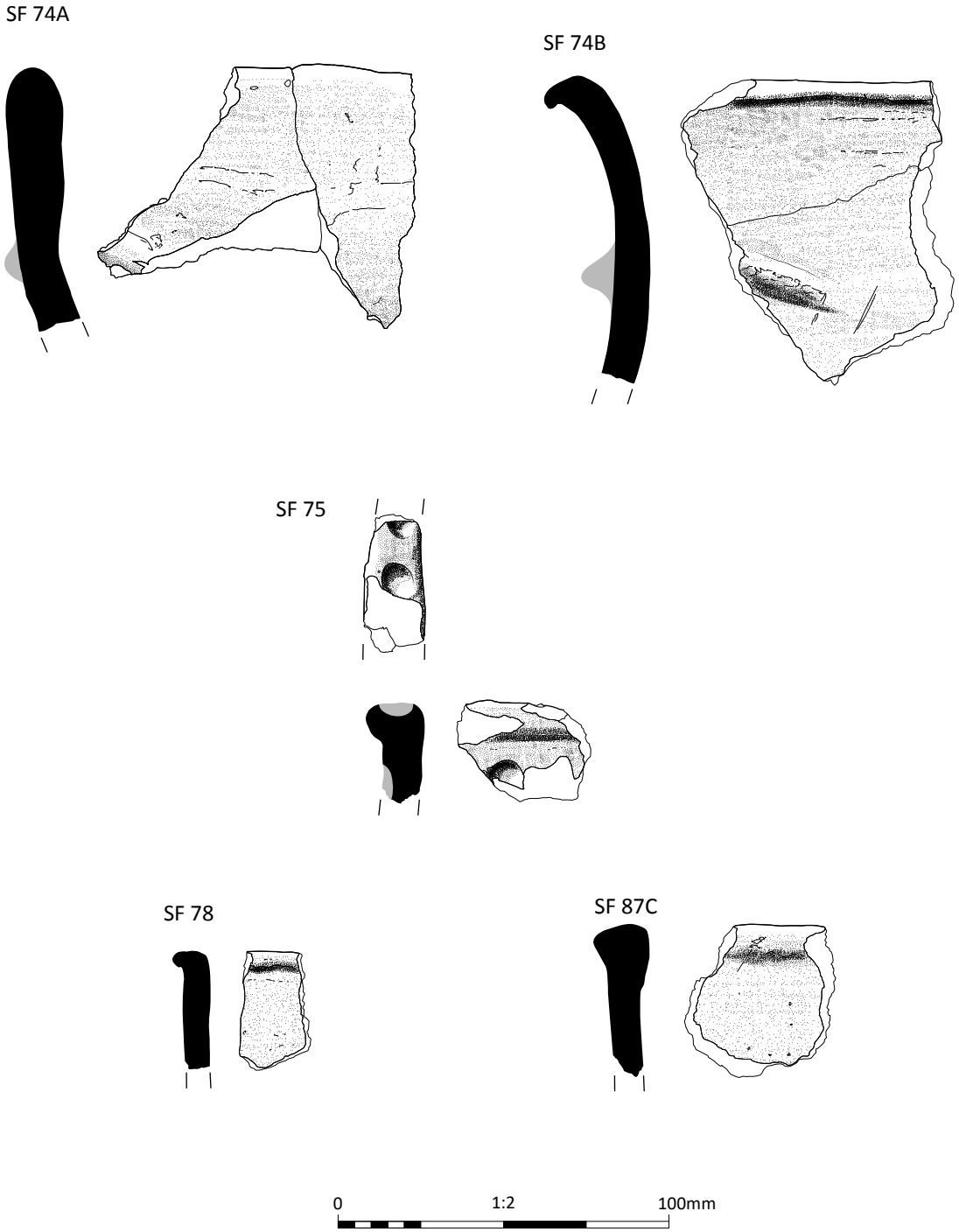


Figure 49: Pottery rims and decorated rim SF 75.

Assemblages of a comparable date in the area include that from Forest Road, Kintore (Cook and Dunbar 2008, MacSween 2008) which produced a round-based assemblage of carinated and uncarinated round-based bowls. The assemblage included vessels with out-turned rims, flared rims and plain rims, and dated to c.3970–3650 cal BC.

Decoration, as seen on the Balbithan bowls from Cairn 103, is not common, but the inclusion of simple decoration has been noted in other assemblages in the region such as such at Crathes, Aberdeenshire (Overflow Car Park site) (Sheridan 2009, 90, fig 44).

It seems that soon after the introduction of carinated bowls, local and regional adaptations were made, such as texturing by finger-tip fluting and the addition of lugs, possibly within a few generations of the introduction of the pottery into an area (Sheridan 2009, 219-20). The Forest Road pottery and some of the other north-east assemblages such as Boghead, Moray (Henshall 1984), Easterton of Roseisle, Moray (Henshall 1983) and Crathes, Warren Field (Sheridan 2009) have finger-tip fluting. The Balbithan assemblage does not have fluting but it does have lugs, so if the Sheridan model is followed, it would be termed a modified assemblage, post-dating the earliest phase, and the dates from contexts with pottery would fit with this.

With regard to the impressed ware from Hut Circle 18, until relatively recently such vessels were thought to date to the early to mid-third millennium BC. Sheridan (1997) suggested the possibility of earlier dates in the mid to late fourth millennium BC. A number of dates for east coast assemblages including Dubton Farm Angus (3639–3374 cal BC at 2 sigma - AA-39948) (Cameron 2002, 68) and the Forest Road excavations at Kintore (3530–3340 cal BC at 2 sigma - SUERC-1322) (Cook and Dunbar 2008, 181) have confirmed the earlier date for this type of pottery. Further discussion of the context and dating of impressed wares can be found elsewhere (e.g. MacSween 2007, 368-70). The later, mid-2nd millennium BC dates from Hut Circle 18 (see Table 13, *Radiocarbon dates*) are therefore incongruous with the assumed dates of the vessels and it is unlikely that such a volume of material could have been accidentally incorporated into the structure.

Radiocarbon dates

A total of 21 dates (Table 13) were determined from nine structures. Where possible, charcoal from unabraded round wood from short lived species was selected from key stratigraphic contexts. All dates were single entities.

Chronology

The radiocarbon dates indicate two main clusters of activity: the Neolithic and the MBA, with two additional dates in the IA and LBA. The bulk of the Neolithic dates derive from charcoal within soils associated with cairns and where there is also a large quantity of Neolithic pottery. The Enclosure sealed Neolithic soils and may represent a ring-banked monument. There are no Neolithic dwellings or pits. The majority of excavated hut circles date to the MBA and by extrapolation it is argued that the majority of larger hut circles are both domestic and contemporary. The smaller Hut Circles 8, 18, 26 and 28 are argued to be ring cairns with both Neolithic and MBA dating evidence. Finally, Hut Circle 17 is argued to be a slight enclosure with both MBA and LBA activity.

Additionally, Mesolithic activity was identified from diagnostic lithics, although the majority of lithics potentially date from between the Mesolithic to LBA. The majority of cairns remain undated, but many are likely to be Neolithic or Bronze Age in date and appear to be respected by pre-improvement agriculture. We can also infer post-medieval activity at Balbithan from the survey evidence (RCAHMS 2007, 80), such as the farm buildings and post-improvement fields.

By no means can the radiocarbon assemblage be described as random. The sequence also cannot reflect the total duration of activity at Balbithan, most of which will be archaeologically invisible, or simply not recognised within an active wood, for example the Neolithic and early medieval at Kintore would have been hard to identify (Cook and Dunbar 2008). The absence of IA dates from the hut circle assemblage does appear to be real, implying they are either not present or not archaeological visible, which will be returned to later.

While the total assemblage of dates is small it is worth noting that the Neolithic material is

focussed on the south-west of the site, closer to the Don Valley, while the bulk of the hut circle and MBA activity is located to the north-east. Certainly, it is worth noting that the largest cairn on site (Hillhead of Suttie Canmore ID19506, Figure 4) is also located on the southern side. Does this perhaps indicate a distinction, that certain areas used in the Neolithic were avoided by MBA activity?

Elsewhere commentators have discussed apparent breaks or gaps in middle and late Neolithic activity (Dingwall *et al.* 2019, 320-1 summarises the current position) and while one date from Balbithan relates to this apparent gap, no discussion is offered on such limited evidence.

Feature	Revised No	Sample	Material	Description	Context no	Uncal BP	Calibrated 1-sigma	Calibrated 2-sigma	Delta-13C ‰
HC 5		SUERC-36866	Alder charcoal	Hearth feature, associated with occupation, over 36871	212	3190±30	1494-1435 BC	1513-1414 BC	-26.2
HC 5		SUERC-36871	Alder charcoal	Pre-bank charcoal layer, pre occupations, under 36866	216	3315±25	1626-1532 BC	1669-1522 BC	-25.5
HC 13		SUERC- 9498	Alder charcoal	Hearth feature, abuts 9502 and 9503	14	3230±35	1525-1445 BC	1620-1420 BC	-26.6
HC 13		SUERC-9502	Hazel charcoal	Hearth feature abuts 9498 and 9503	14	3265±35	1610-1490 BC	1630-1450 BC	-26.8
HC 13		SUERC-9503	Hazel charcoal	Heath feature abuts 9498 and 9502	14	3270±35	1610-1500 BC	1630-1450 BC	-27
Outside HC 13		SUERC-36870	Birch charcoal	Pit feature outside HC 17	10306	3190±30	1494-1435 BC	1513-1414 BC	-27.2
HC 17		SUERC-36872	Alder charcoal	Hearth feature	405	3190±30	1494-1435 BC	1513-1414 BC	-27
HC 18		SUERC-49519	Birch charcoal	Fill of bank, above 49520	902	3235±29	1526-1455	1607-1434 BC	-27.1
HC 18		SUERC-49520	Alder charcoal	Material under bank, below49519	907	3241±29	1531-1454	1608-1440 cal BC	-25.3
HC 19		SUERC-42990	Alder charcoal	Charcoal within subsoil from use of the structure, abuts 42994	805	3127±27	1436-1387 BC	1491-1316 cal BC	-24.5
HC 19		SUERC-42994	Alder charcoal	Charcoal within subsoil from use of the structure, abuts 42990	703	2975±29	1263-1131	1368-1091 cal BC	-26.8
HC 28		SUERC-42988	Alder charcoal	From within paving, abuts 42989	505	3281±27	1561-1519 BC (34.9%)	1626-1496 BC	-25.9
HC 28		SUERC-42989	Birch charcoal	Charcoal within susboil from use of structure, abuts 42988	605	3186±27	1494-1432 BC	1540-1413 BC	-25.4
HC 29		SUERC-57510	Birch charcoal	Charcoal from hut circle interior, abuts 5711	2103	3288±28	1611-1531 BC	1626-1503 BC	-25.0 ‰
HC 29		SUERC-57511	Birch charcoal	Charcoal from hut circle interior, 5710	2003	3321±28	1585-1535 BC	1684-1527 BC	-25.5 ‰
CC 3	CC 105	SUERC-49521	Alder charcoal	Charcoal buried topsoil layer, sits below 49518	1105	4497±29	3334-3105	3346-3096 BC	-26.4
CC 3	CC 105	SUERC-49518	Alder charcoal	Charcoal from fill of cairn, sits above 49521	1102	1766±29	233-330	AD 139-378	-25.6
CC 26	CC 103	SUERC-57509	Hazel charcoal	Charcoal from underlying buried soil, above 57512	2704	4799 ± 29	3579-3534 BC	3605-3523 BC	-26.2 ‰
CC 26	CC 103	SUERC-57512	Oak charcoal	Fill of cairn, over 57512	2604	5111 ± 28	3861-3812 BC	3879-3802 BC	-25.5 ‰
CC 26	CC 103	SUERC-65805	Hazel charcoal	Charcoal fill of cairn	3017	4784 ± 30	*	3642-3521 BC	-28.0‰
Enclosure		SUERC-65804	Alder charcoal	Charcoal from primary deposit	3220	4859 ± 30	*	3704-3632 BC	-25.9‰

Table 13: Radiocarbon dates.

Discussion

The project was always intended to have a broad landscape base, reflecting a long term research commitment to a particular area. It aimed at both enhancing the existing Kintore dataset and developing more nuanced research questions for Balbithan. The programme of work targeted upstanding features and, while small scale negtive features were identified in physical proximity to these sites, no larger pits or plough truncated roundhouses were identified. This however, is considered a product of the excavation methodology and it is assumed, based on the excavations from Kintore (Cook and Dunbar 2008), that such features are present but were simply not observed.

As noted above, while commercial forestry operations have damaged the Balbithan resource, the overwhelming threat to the remains is from bracken and burrowing animals. The 'ticking clock' to recover information is real and impacts archaeological remains across Scotland. The author believes that projects like Balbithan identify a way forward, with targeted research embedded in the community and in partnership with Local Authorities, National Bodies and the Commercial Sector. In effect, this may require a programme of assessment to determine which sites are under active threat and then to target them. The task is clearly enormous, but greater collaboration and coordination is surely the way forward.

Lithic scatters

The evidence indicates the presence of at least five Mesolithic to MBA lithic scatters, although this is likely to be an underestimate within the wood. In addition, the precise scales, extent, date and nature of these scatters is uncertain. It is likely that the same locations, presumably providing key-viewpoints and access to water and other resources, were used repeatedly. Such peripatetic use forms a significant aspect of the current accepted models for Mesolithic and Neolithic settlement in Aberdeenshire and indeed mainland Scotland (Noble *et al.* 2016, Brophy 2016). Indeed, the presence of residual artefacts inside MBA hut circles indicates the long term focus of prehistoric peoples on favourable locations. It should be noted that the author prefers to think of those lithics found with hut circles as more likely being residual than in situ (contra Dickson, *Lithics and coarse stone tools*) based on a wider reading of current thinking in Scotland (e.g. McCullagh 1998, 139)

Moving beyond Balbithan it seems likely that the lithic scatters were associated with the movement of peoples along the River Don, in much the same way as recent reports have demonstrated along the Dee (Murray and Murray 2014, Wickham-Jones *et al.* 2016). It is also increasingly clear that Mesolithic peoples exploited a wide variety of differing landforms and elevations across Aberdeenshire (Warren *at al.* 2018, Dingwall *et al.* 2019, 314, ScARF 2012b).

The recovery of burnt lithics within the assemblage may imply the presence of hearths and perhaps structures, though they could of course have been burnt by later activity. However, it is not clear if the at times more ephemeral nature of some forms of Mesolithic (Gooder 2007) and Neolithic settlement structures (Cook and Dunbar 2008, 54, 81, Brophy 2016) could have survived or even been detected within Balbithan, given the nature of both the project and the site's commercial forestry.

While noting the difficulty in distinguishing late Neolithic and Bronze Age lithic scatters (ScARF 2012c), as noted above it seems probable that the bulk of the lithic scatters inside the hut circles are residual. This was supported by the low level of lithics recovered from the excavation of MBA roundhouses at Kintore (Cook and Dunbar 2008) and indeed elsewhere in Aberdeenshire (Lochrie 2019, 188-9), although presumably any finished objects are potentially contemporary. It is of course possible to identify roundhouses and hut-circles with lithic assemblages (e.g. Lairg, Highlands, Tormore on Arran, Tulloch Field in Perthshire, and Gairnhill, Aberdeenshire (Finlayson 1998, 136, Finlay 1997, 22-23, Cartwright 2014, Lochrie 2019). However, detailed assessment of the deposits often indicates residuality (McCullagh 1998, 139 contra Finlayson 1998, Finlay ibid.). Of course, one would not necessarily expect an accumulation of sharp objects on a floor surface: although this was the case at Dunbar (Gooder 2007). Indeed at Tormore there was a concentration of lithics outside the entrance, either indicating regular

cleaning out of the structure or a focus of lithic working outside the entrance (Finlay ibid.).

The field interpretation mooted the possibility that the lithic scatter to the south-east of Hut Circle 17 may have been contemporary, implying that lithic production took place outside, presumably both utilising better light and avoiding the deposition of sharp flakes on the floor. The relative absence of bipolar technology in this area, implying a later tradition of lithic working (see *Lithics and coarse stone tools*), may also support such an interpretation.

Buried soil surfaces

In general, the presence of charcoal in buried soils under structures is assumed to indicate refuse from domestic activity and presumably middening (cf Carter 1993), although it could also derive from a range of other activities such as forest clearance. Even with some level of middening, it is likely that these were short term focal spots, as the soil would eventually become exhausted and people would move to another plot and then another, perhaps returning to the original location after a generation. It may be that the presence of so many clearance cairns supports the potential for land preparation. While there is Neolithic, MBA and LIA charcoal (Table 13) from either clearance cairns or buried soil surfaces, there is at present no Neolithic or LIA structures at Balbithan, though both were present at Kintore (Cook and Dunbar 2008).

While no charred cereal grains were recovered from Balbithan they were present across the entire sequence at Kintore (early Neolithic to medieval) (Holden *et al.* 2008) but it is also clear that such material could be both intrusive and residual (Cook and Dunbar 2008, Table 2). Charred cereal grains from Kintore were dated to the early Neolithic, the early Iron Age, the late Iron Age and the early medieval (ibid.), suggesting some arable practices during these periods.

Regarding the Neolithic dated charcoal, most is associated with complex structures (Cairn 103 and the Enclosure) that are not merely clearance cairns sealing older soils. Even Cairn 105 may have had a kerb, although no complex deposits were observed. It may be that this charcoal represents clearing events associated with the creation of the structures, rather than relating to Neolithic agriculture, which in the early Neolithic has been argued to be focussed on free draining soils (Dingwall *et al.* 2019, 320-1). Certainly, one would assume that the monuments were built in clearings within a predominantly wooded landscape (cf Tipping et al. 2009) during the fourth millennium BC.

Cairns

Given the destructive impact of both improvement agriculture and 20th century forestry operations there were clearly far more cairns in Balbithan than currently survive. The majority of them are likely to be related to stone clearance from agriculture and thus a proxy of wider human activity in the wood. As noted above, stone clearance was also detected around the edges of some of the hut circles. Indeed, presumably the gathering of stone components of hut circles also helped improve the agricultural holdings. However, it is not clear if such clearance relates to pastoral or arable agriculture, though both are possible (Quatermaine and Leech 2012, 317).

It is also not possible to date the construction of most of the cairns, and it is assumed that there are at least three periods of prehistoric agriculture, based on the presence of absolute dated structures: Neolithic, MBA and LIA, although again we cannot be certain if these are continuous or intermittent. Elsewhere the majority of such cairns are often assumed to be connected to pioneer agriculture, i.e. the primary clearing of the woodland (Johnston 2020, 304). The bulk of the cairns are small and located in the same broad area as the bulk of the hut circles, and it is tempting to assume that the majority are broadly contemporary with each other.

The close proximity of numerous small clearance cairns to each other (Figure 3) and the presence of clearance around bigger features (e.g. Hut Circle 17), may indicate small plots of land, where stones were carried only the most minimal distance. However, every excavated cairn in the study was located on bedrock, which could not be cultivated. Perhaps cairns on bedrock may also have helped identify features that would damage an ard if ploughing or a sickle if cutting grass (Askew *et al.* 1985, 19). This of course provides an ongoing utilitarian use for such cairns for perhaps millennia after their construction. As with the buried soils, it is likely that the cairn

builders were operating across a large landscape, moving as the soil became exhausted (Brück and Goodman 1999, 10).

The linear clearance associated with C 105, suggests a different style of agriculture and perhaps one associated with bigger fields. Carter (1993, 231) argued for an LBA date for the coaxial field system at Tulloch Wood, Forres. Further comment is difficult however as the features are undated and of uncertain scale, though it is noted that C 105 had an LIA date associated with it, so perhaps we may date the linear clearance to this period also. It is worth noting that third and fourth centuries AD activity in Scotland is remarkably rare (Hunter 2007, 49). There appears to have been an abandonment of existing locations and settlements which was certainly observed at Kintore (Cook and Dunbar 2008, 320) and elsewhere in the North East e.g. Birnie, Elgin (Blackwell *et al*. 2017, 29) and Old Kinord (Romankiewicz *et al.* 2020, 241). Hunter (2007) has proposed that this dislocation was caused by Roman interventions in Scotland. The limited evidence from Balbithan may hint at a move from the long-established settlement at Kintore to Balbithan? Noble's excavations at the sea stack Dunnicaer, hint at the establishment of new settlement locations during this period (Noble *et al.* 2020). However, equally another project by the author at Battle Hill, Huntly, in which a newly discovered upland enclosure (c. 170 m OD) dating to the third and fourth centuries AD appears to reoccupy an older location (Cook *et al*. 2020).

Non-Clearance Cairns

Two of the six (33%) sampled cairns (C 103 and 271) were clearly not clearance cairns: Cairn 103 was dated to the early Neolithic and Cairn 271 was undated but covered a cache of lithic cores, which could date from the Neolithic to Bronze Age. The overall percentages despite being a very small sample might suggest a third of the 217 surveyed cairns might be more than mere clearance cairns.

Cairn 103

Cairn 103 represents the creation of a monument from a natural lump of bedrock with elaborate fissures. The radiocarbon dates indicate a calibrated range of activity from 3879–3521 cal BC. However, one date is from oak charcoal (SUERC 57512, 5111 ± 28 BP), which raises the possibility of an older tree. In addition to the three dates, (SUERC 57512) the oldest with a range of 3879–3802 cal BC, is from the fill of the cairn, and could represent older material added to it. Elsewhere, hazel charcoal from the cairn's fill was dated to 3642–3521 cal BC (SUERC 65805, 4784 ± 30 BP) and the third date (SUERC 57509, 4799 ± 29 BP) 3650–3523 cal BC, came from buried soil under the cairn. These dates are supported by the pottery assemblage recovered from the features.

There are presumably seven stages to this monument's construction and the following may be tentatively proposed as a possible sequence:

1. The identification of the rock
2. The excavation of the fissures
3. The filling of the fissures with soil and occasional tools
4. The collection and curation of objects from a series of unknown locations over an unknown period
5. The deposition of 184 sherds from 41 different early Neolithic round-bottomed vessels, the majority of which are unabraded and selected portions of the original vessel
6. The construction of the cairn (stone, soil and charcoal) from a variety of sources, some potentially older
7. The deposition of lithics around the cairn's edge

The period over which these events took place is unclear, although given the lack of abrasion on the pot, perhaps the pottery deposition and cairn construction may have been rapid events. Though, of course, bedrock knolls may have been a focus for much longer earlier activity. Indeed, the constructed cairn itself may have continued to be a locus of veneration or seasonal visitation.

If not for the pottery and other artefacts present, Cairn 103 would simply have been imagined to be a clearance cairn. It is worth stressing that this was the only cairn excavated with pottery in it. While no evidence for human remains was uncovered, and rock art was not identified, with less than 50% of the cairn excavated, both these could still be present in unexcavated areas of the cairn.

While this cairn appears to be unique in Scotland at present, it features traits common across the Scottish Neolithic. A preference for fissured rock is a factor in site selection of Kilmartin rock art (Jones and Tipping 2011, 17). Richards (2013, 271) argues that the large fissured bedrock knoll Cnoc an Tursa at Calanais may even have been the primary focus of the stone circle and avenue, and one unusual cleft in the deeply fissured bedrock at Udal, North Uist, was used for ritual activities during the later Neolithic (Ballin Smith (ed.) 2018, 206). Equally, depositions of pottery, lithics and charcoal are commonplace amongst Neolithic monuments (e.g. Anderson-Whymark and Thomas 2012) and indeed within fissures (Jones *et al.* 2011, 60-63). It is also clear that prominent natural rocks and features can become the focus of prehistoric deposition activity (e.g. Bradley 1993, 27, 2000, Becket and MacGregor 2012, 56-7).

The cairn itself may be another rare example of the non-megalithic round mound tradition (Sheridan 2010), while the mound did not appear to be round it had been impacted by forest ploughing. These mounds feature a diverse range of types but do always feature the deposition of charcoal, lithics and pottery.

Perhaps the most telling parallel to the feature is Neolithic structured deposition within pits (Anderson-Whymark and Thomas 2012). The author's excavations at Kintore (Cook and Dunbar 2008) revealed a variety of Neolithic pits, which have been reviewed by Noble (*et al.* 2016). The early Neolithic pits at Kintore reveal that their contents reflect a range of everyday functions and are not merely rubbish disposal. Some were deliberately placed, while some are located around existing monuments and older locations and represent long term repeated visits. There is both meaning and pattern to both the excavation of the pits and the deposition of their contents. The absence of collapse within the pits implies that they were dug and filled quickly, though we cannot know the biographies of the objects themselves, which could be considerably older (Becket and MacGregor 2012, 58-9).

It seems likely that Cairn 103 should be viewed as a related element to the early Neolithic pit digging at Kintore, small scale rituals at key locations reflecting rapid events in positions returned to again and again over the long term. It may be that some of the pits encountered at Kintore (Cook and Dunbar 2008, 56-72) were once located around no longer extant cairns.

Cairn 271

This small, damaged cluster of stones covered a cache of nine unused and undated flint cores. It is not clear if this represents a store or a tribute. Its proximity to Hut Circle 18 indicates a potential relationship between the two. Certainly, given its small scale and the difficulty with which such a small deposit could have been relocated in the landscape, the author prefers to view the material as a tribute, and it will be discussed in connection with Hut Circle 18.

The Enclosure

The nature and function of the Enclosure is uncertain, however, it is tentatively suggested that it may be a something similar to the Midtown of Pitglassie mound (Shepherd 1996).

Hut Circle variables

As stated above some 27 hut circles have been observed in Balbithan Wood, of these eight were sampled and seven dated. Of these eight, five were argued to be roundhouses and three to be non-hut circles. All of the dated hut circles (four) belong to the MBA. It may be therefore assumed that the majority of the unsampled hut circles were probably MBA in date.

The original aim for the project was to compare and contrast upstanding hut circles with ploughed out remains at Kintore, and Table 14 compares the sampled structures. It was assumed that either the two sets of structures were built by the same community moving across a broad landscape in a peripatetic manner, or by contemporary if discrete communities.

It should be noted that both the sample number and date range at Balbithan are considerably smaller than those of Kintore and environs, where a total of 32 roundhouses were excavated ranging from the MBA to LIA (Cook and Dunbar 2008, 336). The numbers and apparent densities are comparable. However, when focus is confined solely to the dated MBA structures at both sites their numbers are comparable. It is likely

however, that Balbithan may contain far more structures that are no longer extant.

Two main factors indicate a consistency between the two assemblages: entrance orientation consistently avoids the north (true of all roundhouses in north-east Scotland (Bruce Mann pers. comm) and can be seen as a pragmatic attempt to maximise light in varying conditions rather than reflecting an underlying belief system (Pope 2007). Secondly, all the excavated structures have ring ditches, which of course simply reflects internal use rather than architecture (Cook and Dunbar 2008, 331-2), and therefore we might assume the hut circles/roundhouses structures served a common function.

However, how Balbithan differs from Kintore is more interesting. At Balbithan the ring ditches are shallower and less frequently paved, there are fewer objects recovered from their interiors, there is no evidence for conflagration, the roundhouse size range is considerably more varied and there is no evidence for clustering (Cook and Dunbar 2008, 321-344).

As noted earlier (see *Results*) the underlying subsoil is more likely to be gravel or clay at Balbithan, rather than the sand of Kintore, and as ring ditches derive from internal use, they are presumably likely to be deeper and more frequently require paving in sandy soils than in gravelly soils. However, it may also be that the Kintore houses were used more intensively than those at Balbithan, and this may perhaps suggest seasonal occupation at Balbithan, although this seems unlikely.

Presumably the combination of smaller excavation areas, more limited ring ditch exposure and shallower features, will have limited the presence of objects within the Balbithan structures. This might also explain the absence of evidence for conflagration.

With regards differences in roundhouse sizes Pope (2015, 177) has analysed the average internal areas of contemporary roundhouses across Scotland and revealed an average area of 77 m for upland structures and 85 m for lowland (both Balbithan and Kintore are lowland locations in her study). This of course reveals that larger houses are located in more favourable economic locations. One might therefore assume that perhaps the largest structures were located at Kintore and the smallest at Balbithan, however, it is clear that on average the internal area of the Kintore houses is smaller than those of Balbithan. There is also a considerably greater range of sizes at Balbithan than Kintore. Of course the smaller the structure the less likely its survival in an active plough zone, and in Kintore, the smaller structures might be missing. Equally, as Balbithan has a larger number of potential MBA structures one would expect a greater range of sizes.

However, the figures are misleading. The interiors of Balbithan structures represent accurate internal areas while those at Kintore represent the outer edge of ring ditches. While on exceptionally well-preserved truncated structures it is clear that the external edge of the ring-ditch equates to the edge of the interior e.g. Roundhouse 4 Drumyocher, Aberdeenshire (Johnson 2017, 13), it is not clear to what extent

Hut Circle	External Diameter (m)	Internal Diameter (m)	Area (m^2)	Ring Ditch	Hearth	Entrance	In situ pottery	Coarse Stone	Structural Phases
5	15.5	10.6	85	SE*	SE	SE		Yes	2
13	15.5	9-Oct	78.5	NE*		SE	Yes		2
17	18	12	113	SW* and SE*	NW	E?			1
29	12?	8.75?	60	SW*		SW			2?
RH 24		7	38	N, E and S		W		Yes	
RH 25		8	50	NE, W and S		W/SW	Yes	Yes	
RH 26		7	38	NE, W and SE	SE	W/S	Yes	Yes	More than one
DD ST3		10	78.5	Complete arc		SE	Yes		

Table 14: Comparison of roundhouses at Balbithan and Kintore.

the Kintore structures have been eroded and thus their size minimised. However, one would still have to add 2 m to the diameter of the largest structure at Kintore (Table 14) to get it to match the internal area of the largest structure at Balbithan and so perhaps there is a real pattern here. A point that is worth drawing out is that it's assumed that the walls of the Kintore structures were made of turf and not stone (Romankiewicz 2019). It is not clear what impact this would have on the durability and size of the structures.

Another divergent factor is that while there is broad clustering at Balbithan, the nearest MBA structures are over 20 mm from each other (Figure 3), while at Kintore three structures, Roundhouses 24, 24 and 26 were right next to each other, although it is likely that only two were contemporary (Cook and Dunbar 2008, 88). Elsewhere in Aberdeenshire, there are other examples of tighter clustering on what might be called well drained fertile soils, e.g. Drumyocher, Aberdeenshire (Johnson 2017, 3) and Wester Hatton, Aberdeen (Wessel and Wilson 2019, 265).

The presence of existing cairns, surface bedrock, or no longer extant features at Balbithan could have prevented clustering, even though there appeared to be enough gaps between structures to have allowed it. There were fewer cairns at Kintore because of its sandier subsoil. The difference in size and distribution between Balbithan and Kintore – larger more isolated structures at Balbithan and smaller more clustered houses at Kintore – might reflect some underlying economic factor regarding both areas, and highlights the need for further research to clarify the area's socio-economic systems. Studies elsewhere (Barber and Crone 2011, Halliday 2007) have indicated that in general most timber roundhouses lasted a generation. This might be because they needed frequent replacement or for a variety of reasons that make no sense to us but were considered entirely practical to them (Brück and Goodman 1999). Perhaps the soils in the surrounding fields were exhausted or the houses full of vermin (Hamerow 2002, 15). The MBA structures at both Kintore and Balbithan appear to represent the shifting of households across a landscape as houses and or fields were abandoned. It is not clear if the two zones are part of one system used by the same families over generations though this seems likely. It also seems that the relocation was not necessarily from Kintore to Balbithan but probably within each smaller location.

The broader evidence from Kintore indicates that the interiors of some structures were subject to secondary undated ploughing (RHs 10, 11 and 12 (Cook and Dunbar 2008, 96-104) and Deers Den Structure 3 (Alexander 2000, 20). Romankiewicz (2019, 139) has suggested that this may be part of a planned cycle, where the midden-rich deposits of an abandoned structure were ploughed back into the field. Certainly, the presence of MBA charcoal under MBA structures (Hut Circles 5 and 18) suggests that they were constructed in active farmland over former tilled plots. At Kintore, several four-poster structures were identified in between roundhouse clusters and assumed to relate mostly to agriculture (Cook and Dunbar 2008, 161-4). Again, the use of arable plots to construct monuments is found elsewhere e.g. Achinduich, Lairg (McCullagh 2011, 153-4), RUX6, Udal, North Uist (Ballin Smith (ed.) 2018, figures 2.22 and 2.30). In addition, there is evidence that these structures were actively eroded by arable agriculture (Carter and Holden 2000). However, this appears to have respected the core of the upstanding monument.

This also appears to have been the case at Kintore: a Neolithic Mound was surrounded by around one thousand years' worth of later structures (Figure 50), only one of which impacted on the remains of an older structure. This perhaps indicates a tendency to not remove older structures in antiquity. Certainly, this might explain why so many clearance cairns survived and were not reused to build hut circles, although equally, as mentioned above, these may have been known to mark bedrock outcrops.

While there is certainly more obvious evidence of the reuse of structures at Balbithan than Kintore, reuse is present, as radiocarbon dates suggested more than one phase at two MBA structures: RH 26 and Deers Den Structure 3 (Cook and Dunbar 2008, 317-21, Alexander 2000 21-22) at Kintore. Indeed, a recent review of the evidence from Deers Den argued for the potential multi-phase nature of Structure 3 (Romankiewicz 2019, 138). Elsewhere in the North East there is stronger

evidence for reuse, for example at Peterhead where a timber structure was rebuilt on the same spot five times (Strachan and Dunwell 2003, 158).

Within the structures at Balbithan there are at least two different types of reuse: the first is the construction of a slighter structure in the collapsed remains of a hut circle (Hut Circles 5 and 13) and the second is the complete rebuilding of a slight structure with a larger bank (Hut Circle 29). The time depth between these phases is clearly unknown, but it is assumed to be at least a generation assuming a typical lifespan (cf Barber and Crone 2011) and not a sudden unexpected destruction. Equally the function of these slighter structures is unknown.

Figure 50: The Kintore Neolithic Mound and later activity.

If new structures were restricted to existing platforms, this may explain the apparent absence of post-MBA structures in Balbithan. Of course if any such putative structures used fresh plots but the same architectural form as the secondary phases at Hut Circles 5 and 13, they simply would not be observed, due to subsequent reduction and truncation, in such active woodland as Balbithan.

The Kintore excavations proposed a variety of models to discuss deliberate destruction based on the presence/absence of fire, pits, and objects (Cook and Dunbar 2008, 343-3). However, with hindsight across the evidence from Kintore and Balbithan we can detect three different responses to the 'end' of a structure's life:

1. Deliberate destruction by fire
2. Reuse with perhaps phases of ploughing in between structures
3. Abandonment without apparent reuse and left upstanding

With option 3, while surviving hut circles were obviously left upstanding, the plough truncated roundhouses of Kintore were eventually destroyed. However, it is clear from Figure 50 that even timber roundhouses were not overlain by successive roundhouses or ploughing, which suggests their locations were in some ways respected or thought unsuitable for reuse.

Quite what the factors behind these choices are unknown, however, there is clear evidence for the subsequent monumentalisation of older, abandoned houses. At Old Kinord, albeit during the Iron Age, earlier phases were carefully and partially demolished and incorporated into new structures (Romankiewicz *et al*. 2020, 241). Further afield but during the MBA, Jones (2008) has proposed that Cornish hut circles were transformed into ring cairns after their abandonment. It seems possible that at Kintore and Balbithan abandoned houses may have been preserved, perhaps as monuments to the occupants.

As noted above, the Balbithan hut circle sequence ends after the MBA. However, at Kintore there are LBA and EIA roundhouses and no break in the sequence until the LIA (Cook and Dunbar 2008, 317-21). This apparent break in the settlement sequence after the MBA at Balbithan reflects a general consensus in Scotland (Pope 2003, 394, Halliday 2007), and one exemplified by Lairg (McCullagh and Tipping 1998, 209-11), where MBA settlement and agriculture had expanded onto higher ground which then became more marginal following climatic decline after 1000 BC. This led to settlement abandonment, which was reversed in the Iron Age following the wider adoption of iron technology. At Kintore (Cook and Dunbar 2008, 333-4) the periods following the MBA were associated with an increase in the volume of pit digging within roundhouses. This was argued to perhaps be a reaction to greater economic stress caused either climate deterioration or more competition for the same resources as people retreated from areas like Balbithan. This might also be connected to the appearance of hillfort and enclosures in the wider area (Cook 2015).

However, as Tipping (2002) notes, such areas were never abandoned by pastoralists. In addition, while Balbithan is more marginal than Kintore, it can still be classed as lowland (Pope 2015, 180), especially when compared with a site like Carn Dubh in Perthshire, where LBA structures were identified at between 370-410 m OD (Rideout 1995, 139). At Carn Dubh, pollen evidence suggested there was a pastoral economy in the second millennium BC with arable in the early first millennium BC followed by a return to pastoral in the late first millennium BC and into the following millennium (ibid, 183-5). This may suggest that the economic base at Balbithan was far more tenuous and more prone to climate change than we might have expected. Alternatively, perhaps the absence of LBA and EIA charcoal in the cairns therefore reflects the dominance of pastoralism during these periods. Of course it may be that later houses are present but that they were built of timber and turf, and are simply not visible.

Non-Domestic Hut Circles

As noted in the field interpretation (see *Results*), five of the sampled hut circles were argued to not be hut circles. Hut Circles 8, 18, 26 and 28 are likely to be ring cairn variants, while Hut Circle 19 may be related to cremation enclosures. Only Hut Circles 18, 19 and 28 were sampled but no human remains were recovered at any structure so their interpretation must remain highly speculative.

The radiocarbon dates indicate that Hut Circle 18 was built on and with soils containing MBA charcoal, that Hut Circle 19 enclosed soils containing MBA and LBA charcoal, and that Hut Circle 28 contains features with MBA charcoal. On balance it is argued that Hut Circles 18 and 28 are likely to be MBA in date and that Hut Circle 19 may be either MBA in date and used in the LBA or perhaps constructed in the LBA on MBA soils. Of course, both Hut Circles 18 and 19 could be built on older residual charcoal and therefore be later features. These two hut circles also have deposits with older Neolithic pottery within them. Precisely where this pottery came from is unclear, but it was presumably, given its unabraded nature, obtained from an older feature and was considered significant and important – which seems to have been a common response in Scottish later prehistory (Hingley 1996).

It is clear that there are a series of small circular enclosures that are clearly not domestic structures across north-east Scotland. These forms cover ring cairns, kerb cairns, stone circles, ditched and pit-defined enclosures, many of which are associated with cremations. The date ranges of these monuments run from the EBA to the LBA (Kilbride-Jones 1936, Kenworthy 1973, Ritchie and MacLaren 1973, Rees 1997, Ralston and Sabine 2000, Scott and Jack 2016, Bradley and Clarke 2016, Ginnever and Wessel 2019, 151).

Three recent excavations shed further light on the variety of such features. At Nether Beanshill, excavated as part of the Aberdeen Bypass, a small cremation cemetery dating to the MBA was found. It comprised three individual cremations, pits with complex deposits and a pit-defined enclosure of c. 4 m diameter, and a ditched enclosure of c. 2 m diameter (Ginnever and Wessel 2019, 151). At Hill of Tuach, Kintore, Bradley excavated a cremation cemetery with 12 deposits dating to between 1800 and 1400 BC and associated with an 8.5 m diameter stone circle, which was later surrounded by an LBA ditch and bank (Bradley and Clarke 2016). A final example was a small ring ditch of unknown function at Blackdog, Aberdeenshire, which contained EBA and MBA charcoal. This measured 5.7 m in length by 4.45 m in width and between 0.25 m and 0.45 m in depth, with a single entrance at the southern end of the structure (Wilson 2019).

The excavations at Kintore identified pits with complex deposits dating from the MBA to LBA (Pits 01, 15, 18 and 24), but Pits 01 and 24 may have been urn cremations (Cook and Dunbar 2008, 96-7). All were isolated and without surrounding enclosures. In addition, three of them, Pits 15, 18 and 24, were all within close proximity to the Neolithic mound (Figure 50). It was argued that in the LBA, more pits, with complex deposits were dug, usually within roundhouse interiors (Cook and Dunbar 2008, 338).

All of the above of course raises a question about the contemporary distinction between a ring cairn designed and built as one, and, as argued above, an abandoned yet respected hut circle or roundhouse. At a superficial level these structures are very similar, but they may have been more easily distinguished in the past, perhaps with no longer extant timber elements. It may even be that there was an intimate understanding of the landscape during the MBA but one was gradually expanded to an attitude of respect and preservation for older unknown features.

The creation of landscapes

The sequence at Balbithan appears to contain multiple ancient features all coexisting and respected by successive generations. However, it is not clear if this is in fact the case or if there are undiscovered remains throughout the wood which show truncation by later prehistoric activity. Certainly, even if it were the case, the prominence of bedrock across the area allows an entirely practical and reasonable explanation: existing features marked bedrock which would both have prevented agriculture and damaged agricultural tools attempting to cultivate these areas (see *Results*). We must not smooth out the impacts of dozens of individuals over millennia, as all of them were creating their own dynamic landscapes for their own economic and social needs. We do not know what they destroyed and what they revered, so discussion is cautious.

In broad terms, the same pattern of respect was observed at Kintore (where there was no bedrock) and in particular around the Neolithic mound, which was clearly a prominent landscape feature and can be seen as a focus for later activity from the MBA through to the EM (Figure 50). This complex comprised an oblong space

to the north of the mound created by a pit alignment, surrounded by 15 structures, nine isolated pits and five four-posters. It is clear that the settlement around the Kintore Neolithic mound comprised a mixture of domestic and ritual, and indeed such a distinction is likely to be meaningless for the contemporary community. If we imagine that the MBA/LBA complex pits (15, 18 and 24) were enclosed by upstanding mounds and that roundhouses were gradually placed between the pits and the mound, as noted above, how would one tell the difference between the two? There would simply be a range of mounds, some of which were the remains of relatives' houses and others which may be of more esoteric purpose. Presumably, the more structures were added and subsequently respected the more impressive the complex becomes and the more likely it was to attract later structures (Cook and Dunbar 2008, 360).

If we accept this model what does it reveal for the Balbithan landscape? The evidence is clearly too thin, but it is tempting, despite the reservation expressed above, to look at domestic and ritual landscapes respectively to the north-east and south-west of the wood. However, such divisions were not absolute, as there are at least two domestic hut-circles in the south-west (Hut Circles 13 and 29) and two non-domestic hut circles were proposed for the north-east (Hut Circles 8 and 26), although neither were sampled. This may suggest that the division was not between ritual and domestic but between an older, but respected, Neolithic zone and a newer MBA zone, which is of course in complete contrast to the sequence at Kintore.

Conclusion

The six seasons of the Balbithan project produced a long, if intermittent sequence, stretching from some hints of Mesolithic material to a single LIA date. The bulk of the structures and recovered radiocarbon dates come from the MBA, though some significant early Neolithic activity was uncovered. It should be stressed that the level of complexity identified by the project was only possible because of excavation.

While at first glance the early Neolithic activity was unique, it is clear that it fits within a broader trend with individual aspects finding multiple parallels. As with the pit digging at Kintore (Noble *et al.* 2016, 191-2), these represent several small discrete acts in the same approximate location over a prolonged if unknown period of time. With regard to Cairn 103, the primary focus of the activity was a prominent bedrock outcrop, which raises parallels with rock art (Jones and Tipping 2011, 17) and stone circle site selection (Richards 2013, 271).

The nature of the so-called Enclosure is still unclear. However, it seems likely to the author that it represents a variant on Sheridan's (2010) early Neolithic round mounds. In turn this raises the possibility of a slight cluster of early Neolithic monuments in the south-west of the wood, overlooking the Don Valley. Regardless, the Neolithic evidence adds an important addition to the existing data set.

The Balbithan hut circles are clearly related and contemporary with the Kintore roundhouses, though there are significant variations between the two data sets. At present it is not clear if these differences derive from the differing sampling strategies or sample sizes, or the underlying geology. However, important details have again been revealed. The equivalents of the secondary structures at Hut Circles 5 and 13 would simply have been invisible at Kintore.

Perhaps the most surprising element of the Balbithan assemblage was the absence of LBA to LIA structures, all of which were present at Kintore (Cook and Dunbar 2008, 322). It has been suggested that this might be a response to climatic deterioration, a shift from less fertile ground to the more fertile sands and gravels of Kintore, although of course it is likely that the area was never really abandoned, instead presumably shifting from arable to pastoral economies. However, perhaps the Balbithan sampling methodology has simply missed later structures, which may also have been built of wood rather than stone, thus leaving no trace.

Again, at face value, and accepting the limited sample, there appears to be a division within the Balbithan landscape with settlement focused in one particular location. Assuming that this is a real pattern, it hints at landscape-wide organisation of settlement. Quite what the factors behind

such clustering were are unclear, but could relate to soils, turf for building, water, aspect and so on. But in comparison with Kintore, it is clear that older Neolithic monuments also played a role in creating later foci.

However, in conclusion, the Balbithan project has merely scratched the surface of the wood, there is far more to learn and uncover and it is hoped more will be uncovered in the future.

Afterword

Project participation, evaluation and outcomes

The Balbithan project was entirely open ended, as there was not a heavily structured approach and it was intended to be iterative, innovative and long lasting. The results of each season determined the aims of the next season. Certainly, the main author, with the permission of FLS, had originally intended another five season project building on what has been reported upon here, but it may be more useful to find a third landscape to compare and contrast with both Kintore and Balbithan. Explicitly, this model is unusual outside of the University Sector and the project and its publication clearly met the general aims and objectives of Scotland's Archaeology Strategy (HES 2020). For example, Objective A of Strategy Aim 1, is: '*Through communication and innovative practice, to foster a culture of collaboration and ambition locally, nationally and internationally*.'

The publication of the project is an output which hopefully publicises the innovative, flexible and iterative approach to act as a template for similar work, evidencing and evaluating the methods. It also addresses several key objectives of the main aim identified within *Our Place in Time: the historic environment strategy for Scotland*: *Understand: investigate and record* (HES 2014).

This publication also identifies how the results of each season changed existing interpretation and the proposed research design for the subsequent season. In more general terms, the project broadened and deepened the impact and public benefit of archaeology within and beyond Scotland, though the publicity surrounding the programme of excavation and its results. It will also ensure that the material evidence of the human past is valued and cared for by society and managed sustainably for present and future generations by establishing a previously unknown element to the Scheduled and Nationally Important assemblage of hut circles at Balbithan.

The project has also enhanced existing methods and developed new ones that encourage the sustainable management and protection of our archaeological resources, by ensuring that the managers of Balbithan have access to as much accurate information about the archaeological monuments, and potential for deposits, on their property as possible.

The project involved over 100 volunteers, including 20 schoolchildren and over 7,000 people hours were worked (Plate 51 – composite). Each season the excavations were open to dog walkers and locals to visit and explore. By collaborating with as broad a range of volunteers and learning opportunities as possible the project has enabled and encouraged engagement with our past through creative and collaborative working, active involvement, and opportunities for learning for all ages and enhanced archaeological presentation. The project also maximized public engagement with archaeology and increase the role archaeology can play in education, and benefited from everyone's contribution towards valuing, understanding, and promoting our past. It is also worth noting that without the support of the volunteers the project would simply not have happened.

By engaging with volunteers the project ensured that people had the opportunity to acquire and use the archaeological skills that they needed or desired to have, and that those skills provided the underpinning for innovation in the understanding, interrogation, learning and funding of archaeology.

While no formal impact assessment was undertaken of the project, to measure and evaluate the impact of it, feedback is offered from Jane Summers, a Secondary Teacher who volunteered on the project and brought a class:

'*Balbithan was a fascinating project. Dr Cook worked effectively with Adult Learners, university students and school pupils alike. I developed many valuable skills working on the project including*

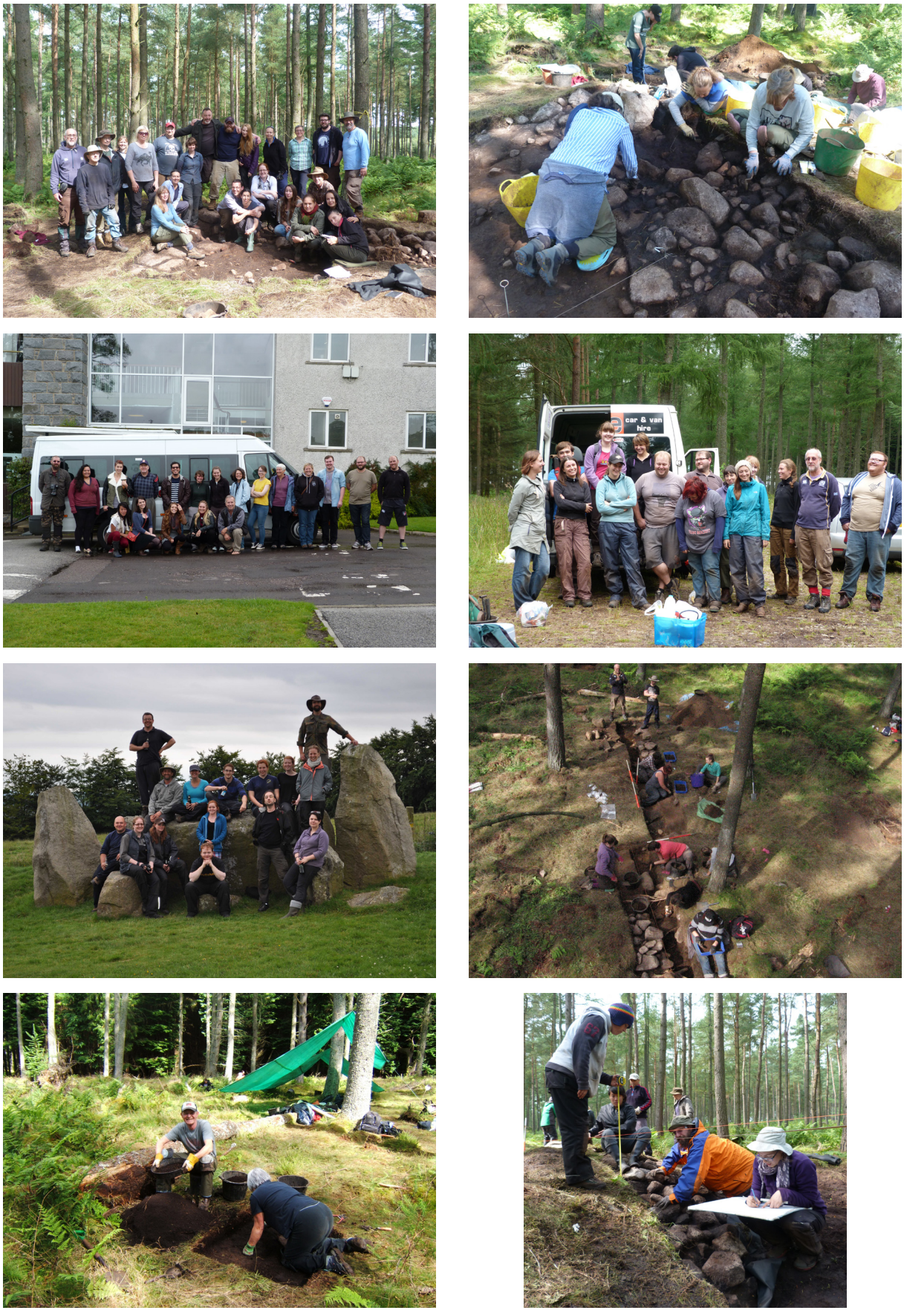


Plate 51: Composite of all years volunteers.

survey and project design. Local volunteers were encouraged and it fostered the development of a local group of skilled volunteers who went on to work with Dr Richard Bradley. A colleague and I used the skills we developed to discover a hitherto miss-designated site and contribute to the write up in Dr Bradley's over-arching review of his work on RSCs. Furthermore Murray was excellent at nurturing young archaeologists. At least three of my Balbithan group went on to study Archaeology as a result of their first-hand experiences. Balbithan also offered me the opportunity to develop as an educator. Balbithan became the first of 3 FLS educational resources that I contributed to, furthering my understanding of interdisciplinary learning. The Picts resource was nominated for a BAA. The impact of the Balbithan Project reached beyond archaeology.'

Hindsight

One of the editors of this volume asked a simple question: what would you do differently? This required an unaccustomed level of honesty and self-criticism for the author. In part this is difficult as the project was always intended as an evaluation, the first stage of a larger project, whatever was done to ground truth the survey was a 'result', although what has been achieved outweighed the initial expectations. The near randomness of the trenches provided an indication of the time depth within the landscape. Equally, while the sampling of some of the cairns was necessary to determine how they related to the roundhouses, the further excavation of Cairn 103 was perhaps a distraction from the core aims of the project. It is also clear that more work should have been undertaken on the roundhouses, more of them should have been sampled and more excavation should have happened of the sampled examples. It is hoped to remedy this situation in future works at Balbithan.

Future research strategy

As noted above, it is hoped to return to the site to build on the results of the first phase and to ask both larger and more targeted questions. Thinking of the site at a larger scale the following analyses would be very useful:

- Pollen analysis, can a local peat source be identified and sampled?
- Can LIDAR data be sourced and used to enhance the existing survey?
- Are there other geo-chemical analyses that might be applied to the site?

Obviously the scope and scale of the above will require more funding and partners, none of which are presently identified. Returning to the established methodology there are six key aims:

- Explore the gaps between upstanding features, and are there features truncated by ploughing between them (roundhouses, pits, etc.)?
- Expose a large portion of a domestic hut circle to explore the use of the interior.
- Confirm the nature of a non-domestic hut circle. Do these structures seal more complex pits and deposits, are there secondary pits around them, do they contain cremated human remains?
- Explore a greater proportion of the smaller cairns to determine if they contain complex or simple deposits.
- Try to locate LIA structures.
- If possible identify a third site to compare and contrast the results of Balbithan and Kintore.

Both this volume and the proposed future work have the potential to contribute the Bronze Age research recommendations identified by ScARF (2012d). In particular the work will contribute to the following questions through more accurate dating of hut circles:

1. The need for a comprehensive of overview of settlement forms and variety, dealing with both the wider context and regionality,
2. To study the effects of climate change by understanding expansion and abandonment,
3. Explore the difference between a Bronze Age way of life and a Neolithic or Iron Age one, including
4. How is society reflected in the settlement record/land organisation? Can it be 'read off'? Were settlements permanently occupied?

Furthermore, the work to date, and the proposed future work, will also have the potential to contribute to North East Scotland Regional Research Framework questions for both the Neolithic (Mann, B 2019) and the Bronze Age (Mann, B unpublished) which in turn aid the management and protection of these sites. In particular:

- How densely occupied was the landscape in the Neolithic and Bronze Age? Were settlements contemporary or a product of pressures over time (resources, climate, people)?
- The dating of Neolithic non-megalithic round mounds needs to be improved
- What is the typical footprint of resources required to build each average roundhouse type in the region? Does the size of footprint influence the decision of where to build?
- What is the relationship between Neolithic monuments in the landscape and the subsequent Bronze Age treatment of them?

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Appendix 1: Lithic catalogue

Link to Appendix-1_lithic_catalogue.xlsx

Appendix 2: Pottery catalogue

Structure, Vessel No. Context and SF Nos	Description	Measurements
Hut Circle 18		
V1 Context 902 (SFs 22, 27 and 28)	Rim sherd, body sherd and three abraded fragments from a carinated bowl. The rim has an internal bevel. The exterior surface has been smoothed with a wet hand finish. The fabric is fine clay with c. 50% of mixed angular rock fragments which has fired hard and is brown. The exterior surface is sooted, especially around the rim	Th 14 mm, Wt 9 g (SF 22), 80 g (SF 27), 8 g (SF 28).
V2 Context 1005/1001 (SF 17); Context 1002 (SF 13)	Rim sherd (SF 17) and a rim and body sherd (SF 13) from an impressed ware bowl. The rim has an internal bevel which is decorated with two parallel lines of impressed twisted cord running round the circumference of the rim. Just below the lip of the rim on the exterior is a line of fingernail impressions. The exterior, interior and bevel are all well smoothed. The fabric is fine sandy clay with occasional rock fragments which has fired hard and is brown.	Th 9 mm, Wt 14 g (SF 17), 12 g (SF 13).
V3 Context 1001 (SF 2)	Rim sherd (broken in two), exterior missing. The rim has an internal bevel. The fabric is fine sandy clay with c. 40% of angular rock fragments which has fired hard and is brown with red margins.	Wt 12 g.
V4 Context 1001 (SF 2)	Exterior fragment. The fabric is sandy clay with occasional rock fragments which has fired hard and is brown. Light sooting on the exterior.	Wt 2 g.
V5 Context 902	Body sherd. Exterior surface smoothed. The fabric is sandy clay with occasional larger fragments which has fired hard and is brown. Patches of sooting in the interior.	Th 10mm, Wt 12 g.
V6 Context 1002 (SF 13)	Fragment from the interior of a base. The fabric is fine sandy clay with c. 40% of mixed angular fragments which has fired hard and is grey/brown. The interior surface is sooted.	Wt 6 g.
V7 Context 1005/1001 (SF 19)	Abraded body sherd. The fabric is sandy clay with occasional larger fragments which has fired hard and is grey with red/brown surfaces.	Wt 8 g.
Context 1002	Fragment of clay or daub. Has one flat surface. Fine sandy clay with organics stuck to a flat stone fragment which has fired hard and is red.	Wt 4 g.
Cairn 103		
Context 2604/3104 (stone and earth fill within T26): 3879-3802 BC	SF 12 Rim sherd. Flat rim – the top coil has been flattened to form a lip to the exterior. There are deep finger-tip impressions (12 mm in diameter and spaced 6-8 mm apart) along the flat part of the rim and just below the lip. The exterior surface is smoothed. The fabric is fine sandy clay with c. 10% of coarser sand which has fired hard and is grey with a red exterior margin.	Th 10 mm, Wt 17 g. (Figure 57)
	SF 18 Rim sherd, body sherd and fragment. Plain rim, folded to the exterior. The top coil which formed the lip has broken off along the coil junction. The exterior surface is smoothed. The fabric is sandy clay with c. 20% of coarser sand/gravel which has fired hard and is red with a grey core. The exterior surface is sooted.	Th 13 mm, Wt 22 g (body), 22 g (rim), 2 g (frag). (Figure 57)
	SF 19 1. Rim sherd, broken off along the lip, like SF 18 (could be from the same vessel although SF 19 is angled slightly differently and is thicker).	Th 16 mm, 32 g.
	SF 19 2. Body sherd. The exterior surface is smoothed and the interior surface is scraped. The fabric is fine sandy clay with c30% of angular rock fragments which has fired hard and is grey with a red exterior margin. Both surfaces are sooted.	
	SF 20 Fragment (no surfaces) (1g) and an interior fragment (8 g). Same as SF 21.	

Structure, Vessel No. Context and SF Nos	Description	Measurements
	SF 21 Exterior fragment (9 g) and two interior fragments (5 g, 2 g). The exterior surface is wiped. The fabric is sandy clay with c. 40% of mixed angular rock fragments which has fired hard and has a red exterior and a grey interior. The interior surface is sooted.	
	SF 23 Interior fragment. The fabric is sandy clay with c.10% of coarser sand which has fired hard and is grey with a red interior margin.	Wt 3 g.
	SF 26 Exterior fragment, broken in two (16 g), second exterior fragment (4 g) and an interior fragment (2 g). The exterior surface is smoothed. The fabric is sandy clay with c. 10% of coarser fragments which has fired hard and has a red exterior and a grey interior. Both surfaces are sooted.	
	SF 25 Body sherd and an exterior fragment with a smoothed exterior surface and deep finger impressions 10 mm in diameter (8 g), and a body sherd (8 g). The fabric is sandy clay with c. 10% of white rock fragments which has fired hard and is grey with a brown exterior margin.	Th 13 mm. (Figure 57)
	SF 37 Body sherd. The exterior surface is smoothed. The surface is pitted where rock fragments have fallen out. The fabric is sandy clay with c. 20% of small angular rock fragments. There is sooting on both surfaces.	Th 13 mm, Wt 32 g.
	SF 40 Two sherds from the rim (4 g, 3 g) and an exterior fragment (<1 g). The rim is flat – similar to SF 18. The exterior surface is smoothed. The fabric is sandy clay with c. 20% of small angular rock fragments which has fired hard and is grey.	
	SF 41 Same vessel as SF21. Three exterior fragments (9 g, 3 g, <1 g). The exterior surface is wiped. The fabric is sandy clay with c. 20% of angular rock fragments / coarse sand which has fired hard and is red.	
Context 2607/3104 (Fill of T26 – same as 3104 = 2604)	SF 26 Exterior fragment, broken in two (16g), an exterior fragment (4 g) and an interior fragment (2 g). The exterior surface is smoothed. The fabric is sandy clay with c. 10% of coarser fragments which has fired hard and has a red exterior and a grey interior. Both surfaces are sooted.	
Context 2704/3004=3105 (T27/ fill of T26) : 3605–3523 BC	SF 6 Small fragment of plain rim/small vessel. The surfaces are well smoothed. The fabric is sandy clay which has fired hard and is grey. Both surfaces are sooted.	Th 8mm; Wt 2g. (Figure 57)
	SF 8 Interior sherd (14 g) and exterior sherd (6 g). Same as SF 21 and SF 41.	
	SF 9 Body sherd (N-shaped junction). Same as SF 26. The interior surface is sooted.	Wt 12 g.
	SF 14 Body sherd (5 g). Same as SF 24.	Th 9 mm.
	SF 16 Body sherd with a coil junction possibly join with rim (2 g), and a fragment (<1 g). Similar to SF 6. The surfaces are smoothed. The fabric is sandy clay which has fired hard and is red with a grey core.	Th 8 mm.
	SF 24 Body sherd. The exterior surface is smoothed. The fabric is sandy clay with c. 20% of coarse sand which has fired hard and is grey. The interior surface is sooted.	Th 7 mm.
	SF 65 Body sherd (same as 74B). Broken in two.	Wt 25 g. (Figure 57)
	SF 66 Interior fragment (same as 74A).	Wt 4 g.
	SF 69 1 body sherd, 9 fragments. The fabric is fine sandy clay with c. 40% of angular quartz which has fired hard and is grey with a buff exterior margin.	Th 14 mm, Wt 40 g.
	SF 70 2 body sherds. The exterior surface is smoothed. The fabric is fine sandy clay with c.10% of angular rock fragments which has fired hard and is grey with a brown exterior surface.	Th 18 mm, Wt 14 g.
	SF 72A Flared rim. The exterior surface is smoothed. The fabric is fine sandy clay which has fired hard and is grey.	Th 8 mm, Wt 5 g. (Figure 57)
	SF 72B Exterior fragment with a lug, and 3 fragments. The lug is 16 mm deep. The fabric is fine clay with c. 40% of small fragments which has fired hard and is brown with a red exterior margin.	Wt 15g. (Figure 57)
	SF 73A 1 rim sherd, 4 body sherds (one is substantial) (same as 74B).	Wt 251 g.
	SF 73B 1 rim sherd (broken in two), 5 body sherds, 1 fragment (same vessel as 74E). Flared rim. The interior of the body sherds are scraped.	Wt 110 g. (Figure 57)

Structure, Vessel No. Context and SF Nos	Description	Measurements
	SF 73C 5 rim or top coil sherds, 5 body sherds, 2 fragments. The top coil is rounded and may have had a flared lip attached. The vessel has had lugs 15 mm deep. The exterior surface is smoothed and the interior surface is scraped. The fabric is fine clay with c. 30% of small fragments which has fired hard and is brown. The exterior surface is sooted and there is sooting/residue in the interior.	Th 17 mm, Wt 418 g. (Figure 57)
	SF 74A 2 rim sherds, 12 body sherds and 18 fragments from a coil-constructed vessel (N-shaped junctions). The rim is rounded, and slightly tapered to the lip. The walls narrow below the rim to a lug 51mm below the lip. The vessel was formed by adding clay to the exterior (or interior) – the vessel has split along the join. The exterior surface is smoothed and the interior is scraped/wiped. The fabric is fine clay with c. 40% of angular rock fragments which has fired hard and is brown. The exterior surface is sooted.	Th 16 mm (top of rim), 11 mm which above lug, Wt 380 g, Dia 300 mm. (Figure 58)
	SF 74B 2 rim sherds and 4 body sherds. The rim is flared. 47 mm below the rim is a lug protruding 12mm from the body. The exterior surface is wiped. The fabric is fine clay with c. 30% of small angular rock fragments which has fired hard and is grey with a red exterior margin. The interior surface is sooted.	Dia 290 mm, Wt 180 g. (Figure 58)
	SF 74C Body sherd, broken in two, possibly part of a round base. The exterior surface is smoothed. The fabric is fine clay with c. 40% of angular rock fragments which has fired hard and has a red exterior and a grey interior. The interior surface is sooted.	Th 13 mm, Wt 86 g (Figure 58)
	SF 74D Body sherd from a coil-constructed vessel (N-shaped junction). The exterior surface is smoothed. The fabric is fine sandy clay with c. 20% of coarse quartz which has fired hard and is brown with a grey interior margin.	Th 13 mm, Wt 35g.
	SF 74E Two body sherds from a coil-constructed vessel (N-shaped junction). The exterior surface is smoothed. The fabric is sandy clay with c. 10% of small angular fragments which has fired hard and is grey with red margins.	Th 14 mm, Wt 25g.
	SF 75 1 rim sherd, 2 body sherds and 36 fragments (some small) – similar to 74A. The rim is flattened with a lip to the exterior and there are deep finger-tip impressions (9-10 mm in diameter) on the top of the rim and 13 mm below the lip. The surfaces are slipped/smoothed. The walls are built up vertically and some of the sherds have split along the join. The fabric is sandy clay with c. 20% of larger fragments which has fired hard and is grey with brown margins. Both surfaces are sooted.	Th 15 mm, Wt 244 g.
	SF 76 2 small body sherds. The fabric is sandy clay with c.10% of angular rock fragments which has fired hard and is grey.	Th 5 mm, Wt 1 g.
	SF 77 Body sherd. The exterior surface is smoothed. The fabric is fine sandy clay with c. 40% of angular rock fragments which has fired hard and is grey with a buff exterior surface.	Th 12 mm, Wt 4 g.
	SF 78 Rim sherd and two body sherds. Flared rim. The exterior surface is smoothed. The fabric is fine sandy clay with c. 10% of larger fragments which has fired hard and is grey.	Th 7 mm, Wt 15 g. (Figure 58)
	SF 80 Fragment. Like 74A.	Wt 2 g.
	SF 86 2 body sherds – same as 74A.	Wt 22 g.
	SF 87A Same as 74A. 3 body sherds, 2 fragments.	Wt 61 g.
	SF87B 3 body sherds and 3 fragments. The exterior surface is smoothed. The fabric is fine clay with c. 10% of rounded and angular fragments which has fired hard and has a red exterior and a grey interior. The interior surface is sooted.	
	SF 87C Rim sherd with a flat lip and a slight interior bevel. The exterior surface is smoothed. The fabric is fine clay with c. 40% of angular and round fragments which has fired hard and is grey with buff margins.	Th 10-16 mm; Wt 38 g. (Figure 58)
	SF 87D Small body sherd. The fabric is sandy clay which has fired hard and is grey with a red exterior margin. The exterior surface is ridged (combed).	Th 9 mm, Wt 3 g.
	SF 91 Body sherd. The exterior surface is smoothed. The fabric is fine sandy clay with c. 20% of angular and rounded fragments which has fired hard and is grey with a red exterior margin.	Th 12 mm, Wt 49 g.

Structure, Vessel No. Context and SF Nos	Description	Measurements
	SF 93 2 fragments – same vessel as 74A.	Wt 4 g.
Context 3005 = 2708 – buried topsoil	SF 60 Small body sherd, broken in two. The fabric is sandy clay which has fired hard and is grey with brown surfaces.	Th 6 mm,Wt 1 g.
Context 3101 = 2606 – topsoil	SF 54 Body sherd. The exterior surface is smoothed. The fabric is sandy clay with c. 30% of larger quartz which has fired hard and is black with a brown interior surface.	Th 9 mm, Wt 9 g.
	SF 55 Body sherd. The exterior surface is smoothed. The fabric is sandy clay with c. 40% of coarser quartz which has fired hard and is grey with a brown exterior margin.	Th 8 mm, Wt 15 g.
	SF 57 Fragment. Same vessel as SF 74A.	Wt 8 g.
	SF 59 Body sherd (small). The exterior surface is smoothed. The fabric is sandy clay which has fired hard and is grey with a buff interior surface.	Th 7 mm, Wt 1 g.
	SF 61 Body sherd – same as SF 55.	Wt 9 g.
Context 3109 – subsoil in C26	SF 68 Body sherd. The exterior surface is smoothed. The fabric is fine sandy clay with c. 20% of small fragments which has fired hard and is grey with brown margins.	Th 13 mm, Wt 18 g.
Unstratified	SF 94 Body sherd. The exterior surface is smoothed. The fabric is fine clay which has fired hard and is red.	Th 9 mm; Wt 14 g.
Enclosure		
Context 3201 – topsoil - enclosure	SF 63 Fragment from a rim. The fabric is fine sandy clay with c.20% of white fragments which has fired soft and is brown.	Wt 4 g

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