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A Middle Bronze Age settlement near Mauchline, East Ayrshire

Stephen Cox FSAScot[1] and Fraser McFarlane[1]
With contributions from Laura Bailey, Beverley Ballin Smith FSAScot, Michael Bamforth, Julie Franklin FSAScot, Julie Lochrie and Fiona McGibbon

Author Contact
steve.cox@headlandarchaeology.com

1 Headland Archaeology UK Ltd
13 Jane Street
Edinburgh
EH6 5HE

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1. ABSTRACT

The excavation of a parcel of land north of Mauchline, East Ayrshire, in advance of a housing development uncovered evidence of human activity from the Neolithic to the post-medieval period. The Neolithic period was represented by a well-preserved assemblage of charred hazelnuts and crab apples in a pit. During the later prehistoric period, the main focus of activity comprised a roundhouse and a souterrain within a fenced enclosure. Radiocarbon dates obtained from the roundhouse and the souterrain indicated a Middle Bronze Age date for these features, strongly suggesting that souterrains existed in this part of Scotland much earlier than previously thought.

2. PROJECT BACKGROUND

2.1 The development

Headland Archaeology (UK) Ltd undertook a programme of archaeological works prior to the development of land north of Mauchline, East Ayrshire between November and December 2019 (Illus 1). The works were commissioned by Hayhill Developments to support a planning application for a housing development and were undertaken after consultation with West of Scotland Archaeology Service. The area was investigated in two phases. An initial trial trench evaluation identified a possible roundhouse and numerous pit features (Fitzpatrick-Sinclair 2019). This was followed by a monitored topsoil strip of two areas measuring 0.95ha in total and a programme of excavation and recording (McFarlane 2020).

2.2 Site location

The proposed development area lay at the northern end of the town of Mauchline, East Ayrshire, in an arable field on a slight rise which gently sloped from 174m above ordnance datum (AOD) in the north to 167m AOD in the south. Mauchline is located in the former comital district of Kyle not far from the north-western edge of the Carsphairn and Scaur Hills of the Southern Uplands.

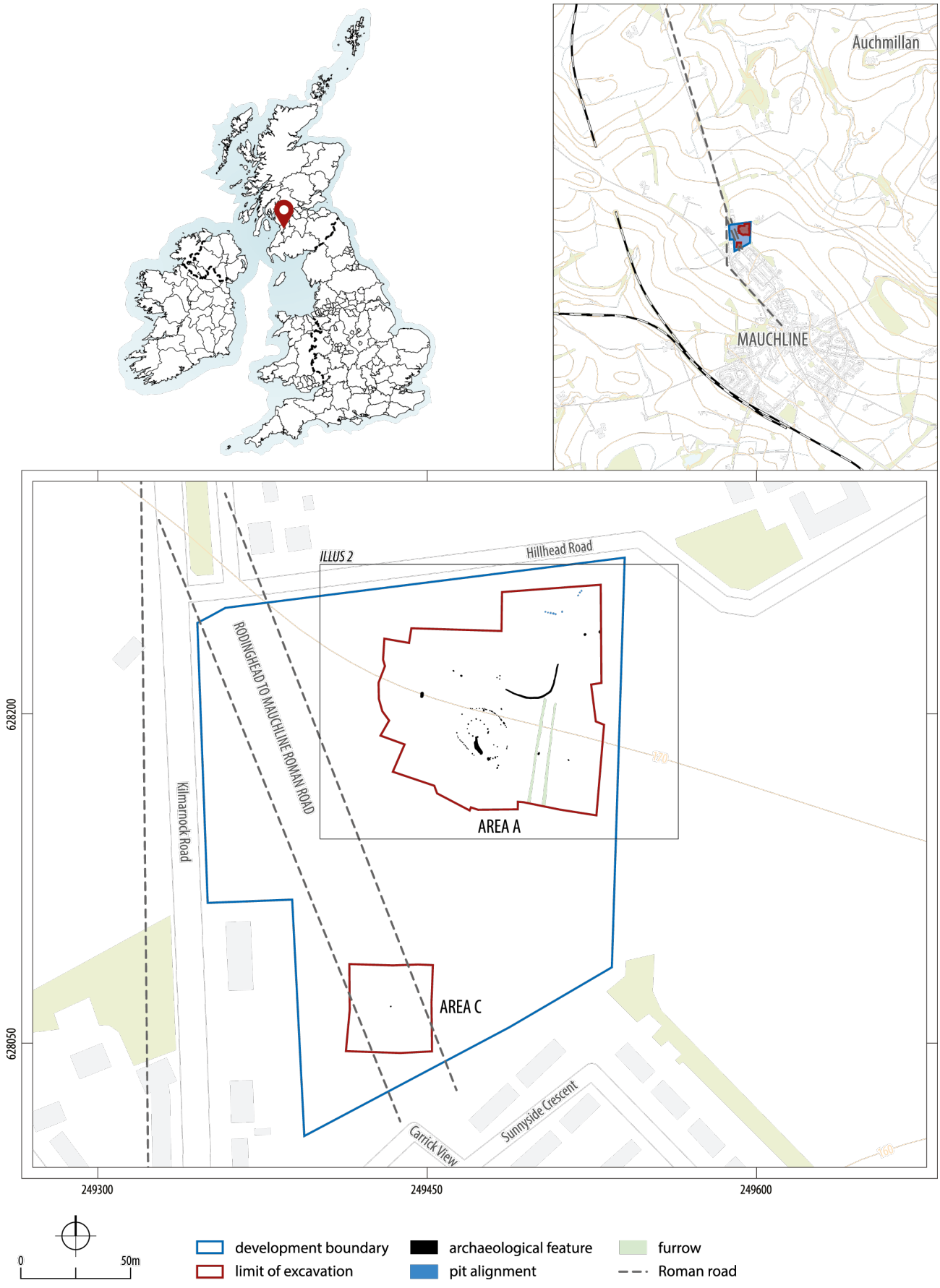
The bedrock geology of the site consists of the Mauchline Sandstone formation formed between 298.9 and 272.3 million years ago during the Permian period; this was overlain by Devensian till (NERC 2024).

2.3 The archaeological background

The proposed development area contained two Historic Environment Records. The first record is for the Rodinghead – Mauchline Roman Road (NRHE ID 73211); a long stretch of straight road running through and to the north of the proposed development area that was identified as a possible Roman road in the 1950s (Illus 1).

The second record (Mauchline Old Road; NRHE ID 73209) refers to an investigation carried out in 1959 by the same team who proposed the possible line of the road. During the works they recorded 'a much perished road with a cobbled bottom and side-ditches' (Clarke & Wilson 1960: 149). The same record notes that the Ordnance Survey team who visited the site in the 1970s found 'no proof in the form associated with Roman finds or structures' and no further investigations were carried out. No further evidence for the Roman road was noted during the trial trenching in 2019, although a number of natural features were identified. These could have been potentially misinterpreted as the 'much perished' Roman road (Fitzpatrick-Sinclair 2019).

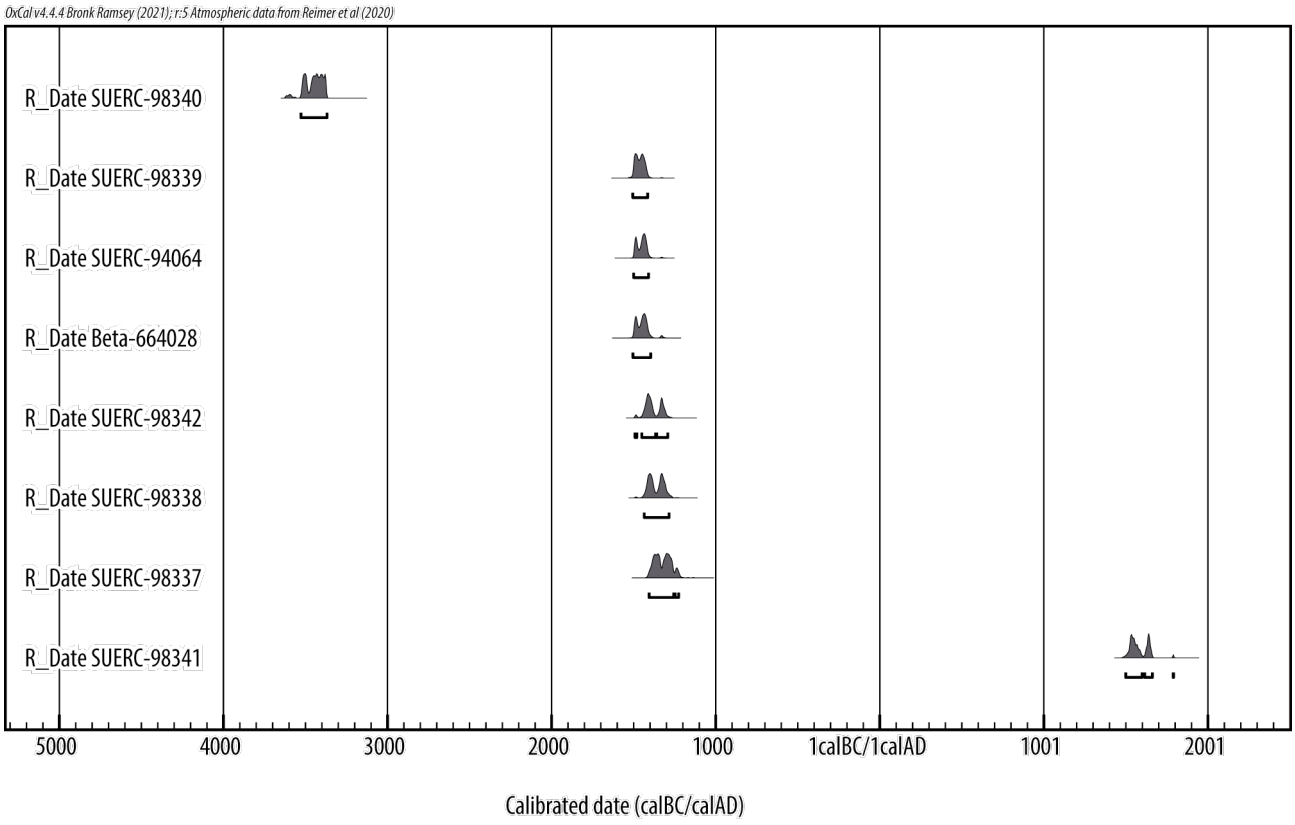
The origins of the town of Mauchline date back to the medieval period, when it functioned as a grange for the Ayrshire estates of Melrose Abbey. The nucleus of the grange was Abbot Hunter's Tower (NRHE ID 42697) also known as Mauchline Castle, believed to date to the mid-15th century. An urban settlement grew around the grange and this settlement was granted a burgh charter in 1510. The parish church (NRHE ID 42706) was constructed in 1829 on the site of a structure which dated back to the early 13th century. The town comprises 19th-century buildings in its centre with 20th-century housing estates on the periphery. Other known heritage assets in the wider vicinity of the development area relate to 18th- and 19th-century agricultural history and include a number of farmsteads.



Illus 1 Site location

3. DATING

Due to the lack of stratigraphic relationships between features and the general lack of spot dates for the cultural assemblage, the radiocarbon dates provided the strongest evidence for the dating and phasing of the site. Eight radiocarbon dates were obtained for material recovered from the archaeological features (Illus 2). Seven non-oak charcoal samples were selected in order to maximise the accuracy of the radiocarbon dates and avoid the 'old wood effect' (Bowman 1990: 51); the eighth sample was from an in situ oak timber preserved by waterlogging. Two of the radiocarbon dates came from charcoal recovered from the fill of post pipes associated with the roundhouse. The charcoal in both cases is interpreted as either the decayed in situ remains of the post or material from activities within the roundhouse that filled the post cavity. Four radiocarbon dates were obtained from material associated with the souterrain, namely two fragments of charcoal and the carbonised residue from a fragment of pottery, all retrieved from the basal fills, and a preserved waterlogged oak post that formed part of the support for the souterrain roof. The oak sample was selected for radiocarbon dating despite the risk of the old oak effect, as it was thought that the result would still contribute to the discussion regarding the origin and use of the souterrain. Radiocarbon dates were also obtained from a fragment of charred hazelnut kernel from a pit in the north-east of the site and a fragment of charcoal from a large pit in the north-west of the site. The radiocarbon dates were calibrated using OxCal v4.4.4 (Bronk Ramsey 2021) and the atmospheric calibration curve for the northern hemisphere (Reimer et al 2020) and are presented in Table 1 and Illus 2.



Illus 2 Overview of radiocarbon dates obtained from the Mauchline site

Table 1 Overview of radiocarbon dates obtained from the Mauchline site

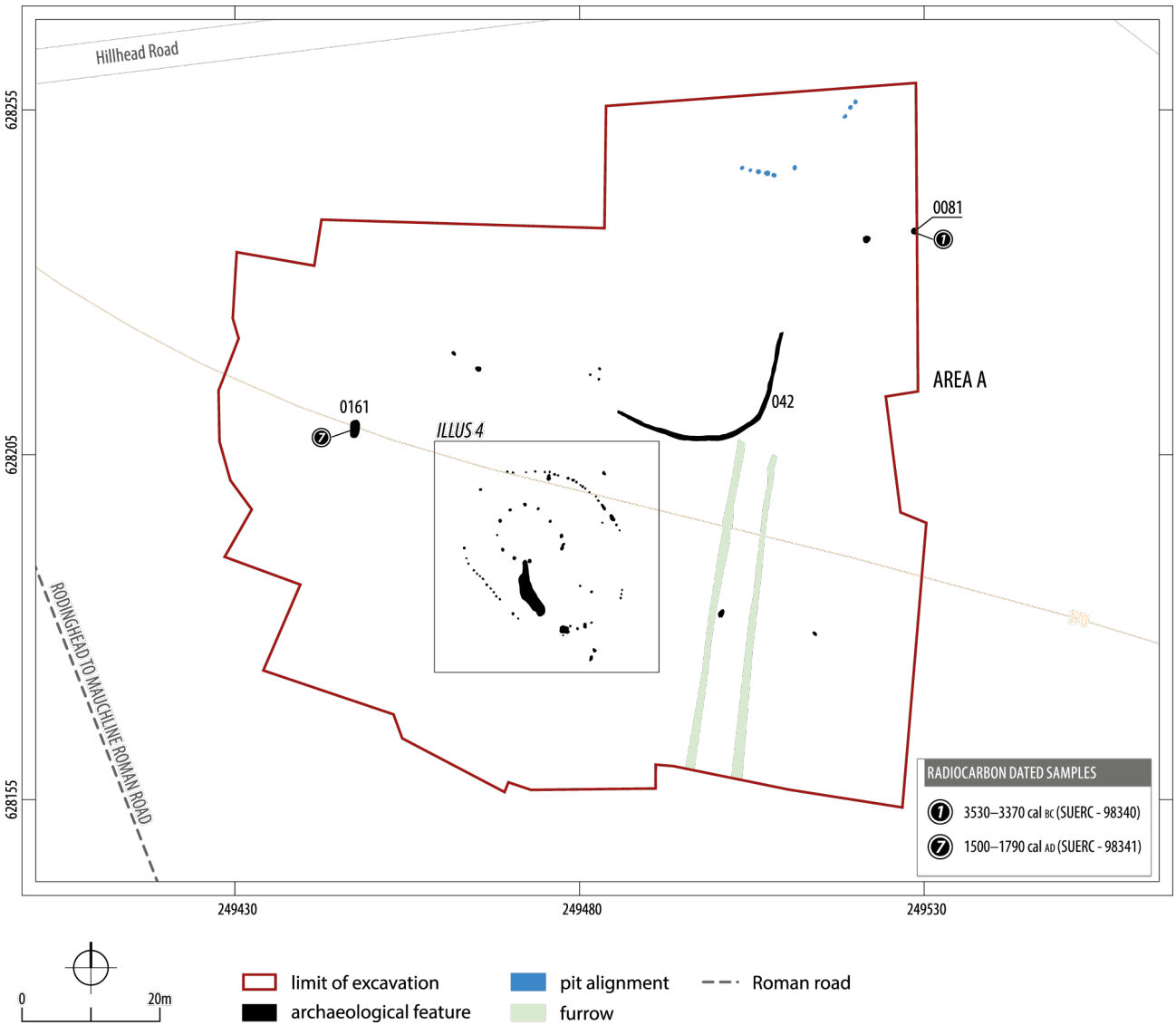
Feature	Context no.	Lab code	Material	Radiocarbon age BP	2σ calibrated date	Location on plan
Pit 0081	0082	SUERC-98340	Hazelnut kernel: *Corylus avellana*	4686 ± 29	3530–3370 cal BC	Illus 3, no. 1
Souterrain entrance passage	0167	SUERC-98339	Charcoal: *Alnus glutinosa*	3189 ± 29	1505–1415 cal BC	Illus 4, no. 4
Souterrain entrance passage	0167	SUERC-94064	Charcoal: *Alnus glutinosa*	3171 ± 24	1500–1410 cal BC	Illus 4, no. 5
Souterrain chamber post hole 0287	0288	Beta-664028	Wood: *Quercus* sp	3170 ± 30	1505–1395 cal BC	Illus 4, no. 8
Souterrain chamber	0212	SUERC-98342	Pottery internal residue	3121 ± 29	1490–1295 cal BC	Illus 4, no. 6
Post hole 0034 (roundhouse)	0036	SUERC-98338	Charcoal: *Alnus glutinosa*	3105 ± 29	1435–1285 cal BC	Illus 4, no. 3
Post hole 0028 (roundhouse)	0030	SUERC-98337	Charcoal: *Alnus glutinosa*	3054 ± 29	1405–1225 cal BC	Illus 4, no. 2
Pit 0161	0162	SUERC-98341	Charcoal: cf Ericales	289 ± 29	cal AD 1500–1790	Illus 3, no. 7

4. EXCAVATION RESULTS

The two areas subject to monitored topsoil stripping were labelled Area A and Area C by the excavation team (a planned third area, Area B, became part of Area A when the latter was expanded during the works) (Illus 1). As per the agreed excavation methodology, discrete features or those forming a structure were 100% excavated, while curvilinear features were 80% excavated (McFarlane 2020: 3). All the features excavated were located in Area A, except for one isolated pit of no obvious function in Area C (not illustrated), and so Area C is not considered in this article (Illus 3). The interpretation of the chronology of the site in this publication differs markedly from that posited in the preliminary Data Structure Report; that is due to the radiocarbon dates, which were not available to the author of the earlier text (McFarlane 2020).

4.1 Middle Neolithic activity

A shallow sub-circular pit, C0081, was recorded in the north-east part of Area A (Illus 3). The feature measured 0.6m in diameter with gently sloping sides and a flat base, was 0.07m deep, and contained two fills. The primary fill, C0082, comprised a charcoal-rich dark brownish-grey fine sandy silt and was interpreted as material raked into the pit from its western edge. This fill was notable for the high concentration of charred hazelnuts and nutshells, with smaller quantities present in



Illus 3 Plan of Area A

the upper fill C0083. Crab-apple seeds were also identified in both fills, though in lesser quantities. A fragment of hazelnut kernel recovered from the primary fill was radiocarbon dated to 3530–3370 cal BC (95.4% probability; SUERC-98340) (Illus 2). It is likely that the pit is evidence of a one-off event taking place in late summer / early autumn in the Middle Neolithic when the hazelnuts and crab apples were prepared for consumption in a hearth adjacent to the pit. Once ready, the prehistoric people scraped off the top of the hearth to access the nuts and then raked the hearth material into the pit. This is discussed further below (see 4.5 'Environmental analysis').

Ten undiagnostic sherds of pottery were recovered from both fills of the pit and are likely to be associated with the consumption and deposition events discussed above (see 4.4.1 'Prehistoric pottery' below) (Table 2).

A lithics assemblage comprising 13 small pieces of debitage was recovered from the fills of post hole C0014 (associated with the roundhouse, the fills of the souterrain) (see Illus 4), and pit C0161 (Illus 3). The lithics could not be assigned to a time period beyond a general prehistoric date, and the small quantities recovered suggest only sporadic occupation prior to the settlement phase. The assemblage is likely to be residual in nature, with the small size of the pieces making it probable that they have moved around through redeposition or bioturbation.

The evidence of the pit and the lithics assemblage is indicative of small-scale one-off activities and is typical of the traces left by early prehistoric people in the landscape.

Table 2 Overview of pottery per context

Feature type	Parent context	Context	No. of pieces	Weight (g)	Thickness (mm)	Diameter (mm)
Post holes roundhouse	0026	0027	6	36.6	13.4	–
	0028	0030	4	58.5	11.9, 12.6	–
	0034	0035	5	8.6	n/m	–
Neolithic pit	0081	0082	2	1.7	n/m	–
		0083	8	25.0	10.0	–
Ditch	0114	0115	2	5.5	8.4	–
Souterrain	0145	0155	6	6.3	n/m	–
		0157	2	6.6	n/m	–
		0158	1	0.2	n/m	–
		0159	4	3.6	n/m	–
	0166	0167	9	84.0	13.0, 10.6, 9.8	–
		0171	1	7.9	11.9	–
	0174	0177	2	6.0	n/m	–
	0178	0204	1	1.1	n/m	–
		0211	4	111.5	11.7	–
		0212	6	133.6	11.7, 12.0	*c* 210mm with *c* 25% surviving (all rims)
		0278	30	150.0	9.8, 10.5, 12.8	–
Post holes enclosure fence	0233	0234	1	23.3	n/m	–
	0263	0264	1	60.3	14.1	–

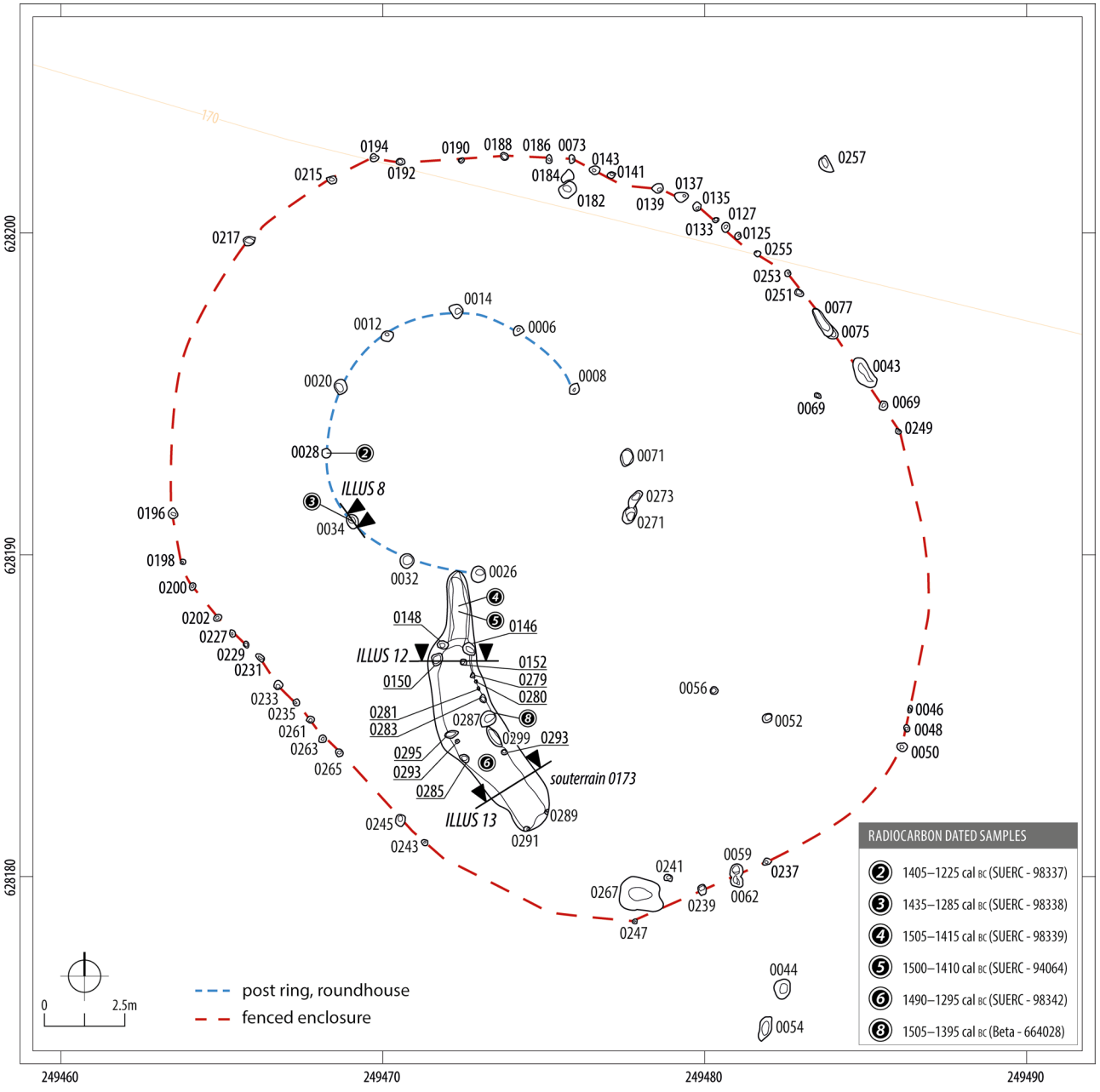
4.2 The later prehistoric settlement

Evidence of a later prehistoric, Middle Bronze Age, settlement comprising a roundhouse, souterrain and fenced enclosure was excavated and recorded in the southern part of Area A (Illus 4).

4.2.1 Enclosure

A fenced enclosure comprising 42 post holes demarcated the core area of the Middle Bronze Age settlement (Illus 1, 3 & 4). The boundary formed an incomplete oval shape in plan and enclosed an area of approximately 1,500m^2. Four gaps, measuring between 11 and 18m wide, were observed in the projected fence line, situated in the north-west, south and south-east of the oval. It is likely that one of these gaps represents an entrance while others may be the result of medieval or later ploughing activity.

The 42 post holes which demarcate the fence line measured between 0.2 and 0.4m in diameter and were between 0.1 and 0.2m deep with vertical or steep sides and curved bases. They were spaced between 0.5 and 1.5m apart. The fills ranged between friable mid-greyish-brown sandy silt and



Illus 4 Plan of core area of late prehistoric settlement

Illus 5 View towards the south-east showing the north-eastern arc of the fenced enclosure

loose dark greyish-brown silty sand. One sherd of pottery each was discovered in two of the post holes, namely in C0233 (Illus 5) and C0263 in the south-western quadrant of the fence line (Table 2).

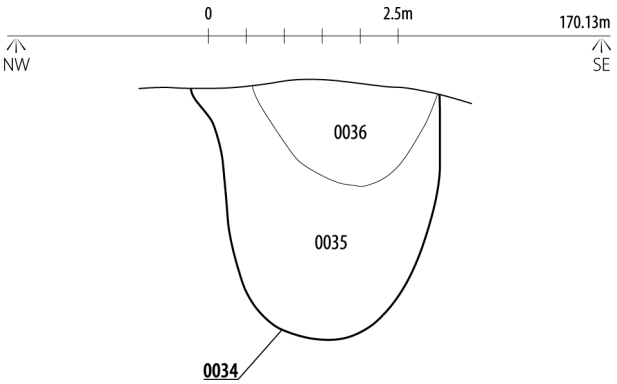
4.2.2 The roundhouse

The roundhouse was situated in the northern half of the enclosure and comprised a post ring measuring 7.5m in diameter (Illus 4). Just to the east of the post ring was a group of three pits C0071, C0273 and C0271, although their relationship to the roundhouse is uncertain. The post ring was formed of nine post holes spaced approximately 2m apart. A 6m-wide gap in the south-east of the post ring was observed between post hole C0008 and C0026 and may be representative of an entrance.

The post holes measured between 0.35 and 0.5m in diameter and were between 0.12 and 0.38m deep. The variations in the depth of the post holes is likely indicative of later truncation by medieval and post-medieval agricultural activities, as shown through the incidence of furrows across the excavation area. A modern land drain also bisected the centre of the roundhouse (Illus 7). The post holes were mostly circular in plan with steep or vertical sides and rounded or flat bases (Illus 6). Five of the post holes – C008, C0014, C0020, C0028 and C0034 – contained post pipes (Illus 8). The post pipes generally comprised dark brownish-grey loose sandy silts and clayey sands and contained fragments of oak and alder charcoal up to 20mm in size. These fragments represent either the remnants of a charred post end or material from the use of the roundhouse that filled the post-pipe cavity. Packing fills used to secure the posts in place were present in the post holes that had post pipes and ranged from firm light orangey-brown clayey sand to loose dark brown silty sand. Two fragments of alder charcoal from the post pipes of post hole C0034 and C0028 were radiocarbon dated to 1435–1285 cal BC (95.4% probability; SUERC-98338) and 1405–1225 cal BC (95.4% probability; SUERC-98337) respectively, placing the roundhouse in the Middle Bronze Age.

Illus 6 South-west-facing section of post hole C0233

Illus 7 North-east-facing view of the roundhouse and modern land drains



Illus 8 South-west-facing section drawing of post hole C0034 showing the post pipe

The fills of the remaining post holes were composed of loose silty sands ranging in colour from mottled grey-brown to dark brownish black. No post pipes were present in these post holes, suggesting that the posts were removed before being backfilled through natural processes. No evidence of post replacement or modification was observed in any of the post holes. Six, four and five fragments of pottery were recovered from the fills of post hole C0026, C0028 and C0034 respectively (Table 2). The pottery was of a similar thickness and coarseness as the sherds discovered in the fenced enclosure and are probably contemporaneous. The significant thickness of the sherds suggests they were used as cooking vessels (see 4.4.1 'Prehistoric pottery' below).

4.2.3 The souterrain

The souterrain, C0173, was located immediately to the south of the post ring of the roundhouse (Illus 4). It had an irregular arch shape in plan and measured 8.3m long, a maximum of 2m wide, and a maximum of 1.3m deep (Illus 9). The top fill of the feature was truncated by a modern land drain over a substantial stretch of its total length.

The entrance to the souterrain comprised a narrow, steep-sided passage, C0166, which was located between two post holes that were part of the roundhouse, namely C0026 and C0032 (Illus 4 & 9). The passage sloped gently down to a step, measuring 0.4m in depth, leading into the main

Illus 9 South-east-facing view of souterrain prior to excavation

Illus 10 Photogrammetric model of the souterrain viewed south

chamber of the souterrain. The main chamber was approximately 6m long with a flat base and vertical sides. It measured up to 1.3m in depth before shallowing slightly to approximately 1.2m close to the south-eastern terminus (Illus 10 & 11).

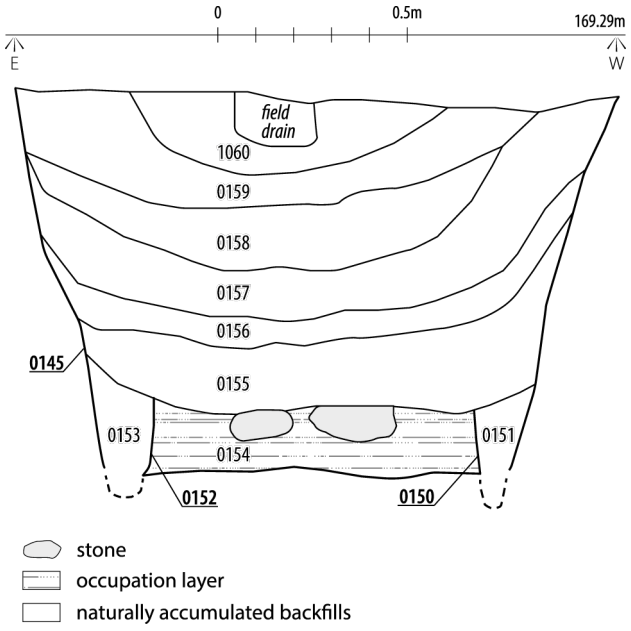
Within the main chamber of the souterrain 15 post holes and a pit were cut into the base. They were generally sub-circular in plan with steep or vertical sides and rounded or flat bases, measured between 0.1 and 0.5m in diameter and were between 0.1 and 0.4m in depth. The fills of the post holes ranged between mid-grey clayey silt to mottled brownish-orange sandy silt. The lack of post pipes in the post holes suggests that the posts were removed when the souterrain fell out of use. However, one post hole, C0287, contained a waterlogged in situ timber. The timber was identified as oak and was radiocarbon dated to 1505–1395 cal BC (95.4% probability; Beta-664028) – an analysis of the wood is included in the environmental report below (4.6 'Waterlogged wood analysis'). It is possible that its waterlogged nature led to it being left in situ, although whether the waterlogging was a factor in the abandonment of the souterrain is not known.

The largest post holes were located in two pairs either side of the step down into the main chamber, with another three large post holes (two forming a pair) located in the central area. Pit C0295, located on the western side beside the three large post holes in the central area, was sub-oval in plan with steep sides and a flat base. It measured 0.75m in length, 0.3m in width and 0.15m in depth. The nature of the cut indicates that it may have been a beam slot. These larger posts and the pit cut for a beam slot may have formed the supporting frame for a wooden roof or plank structure which would have sealed the souterrain.

A line of smaller post holes was identified along the eastern edge of the base of the souterrain between the central posts and the entrance posts. These post holes may have supported a wattle or roundwood lining for the souterrain.

Within the chamber and passage of the souterrain a sequence of fills was identified, relating to the use and disuse of the feature (Illus 12, Table 3). Contexts 0154 and 0278 represented the occupation or usage layer of the chamber, while fill C0167 played a similar role within the entrance passage. The usage layer of the entrance passage contained nine sherds of thick and coarse pottery that was similar to that found in relation to the roundhouse and the fenced enclosure. These fills also contained a possible whetstone which showed evidence of use

Illus 11 Working shot of the south-eastern terminus of the souterrain



Illus 12 North-facing section drawing of souterrain chamber showing post holes C0150 and C0152 and the sequence of deposits

wear (see '4.4.3 Coarse stone' below). Two fragments of alder charcoal recovered from fill C0167 (not in section) were radiocarbon dated; one to 1505–1415 cal BC (95.4% probability; SUERC-98339) (Table 1, no. 2), the other to 1500–1410 cal BC (95.4% probability; SUERC-94064) (Table 1, no. 3).

The usage layer in the entrance passage as well as in the chamber was overlain by a series of naturally accumulated deposits which varied in colour and texture (Table 3). Fifty-five sherds of pottery, again thick and coarse, were found among the lowest fills of the chamber (Table 2). One sherd from secondary fill C0212 contained carbonised internal residue, which was radiocarbon dated to 1490–1295 cal BC (95.4% probability; SUERC-98342).

After the initial abandonment of the souterrain, it appears to have gradually filled in over time through natural infilling, with a range of deposits washed into it. The deposits ranged between C0157 plastic mid-greyish-brown sandy silt to C0205 firm light brownish-orange silty clay and represent continued natural siltation of the souterrain following its abandonment. There was evidence of deliberate

Table 3 Overview of deposits observed within the souterrain

	Usage layer	Primary fill	Secondary fill	Tertiary fill	Quaternary fill	Quinary fill	Senary fill	Septenary fill	Octonary fill
Construction cut 0174		0181	0180	0179	0177				
				Tertiary fill	Quaternary fill				
		Compact mid-greyish-brown clayey fine sand	Compact mid-greyish-brown clayey fine sand	Compact mid-orangish-brown clayey coarse sand	Compact mid-greyish-brown clayey fine sand				
Cut of entrance 0166	0167	0168	0169	0170	0171	0172			
	Usage layer	Primary fill	Secondary fill	Tertiary fill	Quaternary fill	Quinary fill			
	Friable mid-blueish-grey coarse sandy silt	Firm mid-brownish-orange coarse sandy clay	Plastic mid-greyish-brown coarse sandy silt	Firm mid-reddish-orange silty clay	Plastic mid-greyish-brown coarse sandy silt	Friable dark greyish black fine sandy silt			
Cut of chamber (north-west) 0145	0154	0155	0156	0157	0158	0159	0160		
	Usage layer	Primary fill	Secondary fill	Tertiary fill	Quaternary fill	Quinary fill	Senary fill		
	Firm mid-reddish-orange silty clay	Friable mid-blueish-grey coarse sandy silt	Friable mid-brownish-grey silty clay	Plastic mid-greyish-brown coarse sandy silt	Firm mid-reddish-orange silty clay	Plastic mid-greyish-brown coarse silt	Friable dark greyish black fine sandy silt		
Cut of chamber (south-east) 0178	0278	0211	0212	0205	0206	0208	0209	0214	0204
	Usage layer	Primary fill	Secondary fill	Tertiary fill	Quaternary fill	Quinary fill	Senary fill	Septenary fill	Octonary fill
	Firm mid-brownish-red silty clay	Firm mottled grey silty clay	Friable mid-brownish-grey silty clay	Firm light brownish-orange silty clay	Plastic mid-greyish-orange silty clay	Firm light orangish-grey fine sandy clay	Firm mid-greyish brown silty fine sand	Loose light brownish-grey fine sandy clay	Friable dark greyish-brown silty loam

Illus 13 North-west-facing section of souterrain showing concentration of stones near the south-eastern terminus of the chamber

backfilling with dumps of stones at the southern extent of the souterrain seen in C0177 and C0214 (Illus 13). It is possible that the souterrain was used as a convenient place to deposit stones removed during later field clearance activities in the area.

The upper fills of the souterrain were characterised by dark greyish-brown silty loam similar in composition to the topsoil. These fills are interpreted as ploughsoil resulting from agricultural practices and represent the final infilling of the souterrain (as the fills of the souterrain subsided over time). A possible pot lid was recovered from one of these upper fills, C0204, and is interpreted as a residual find.

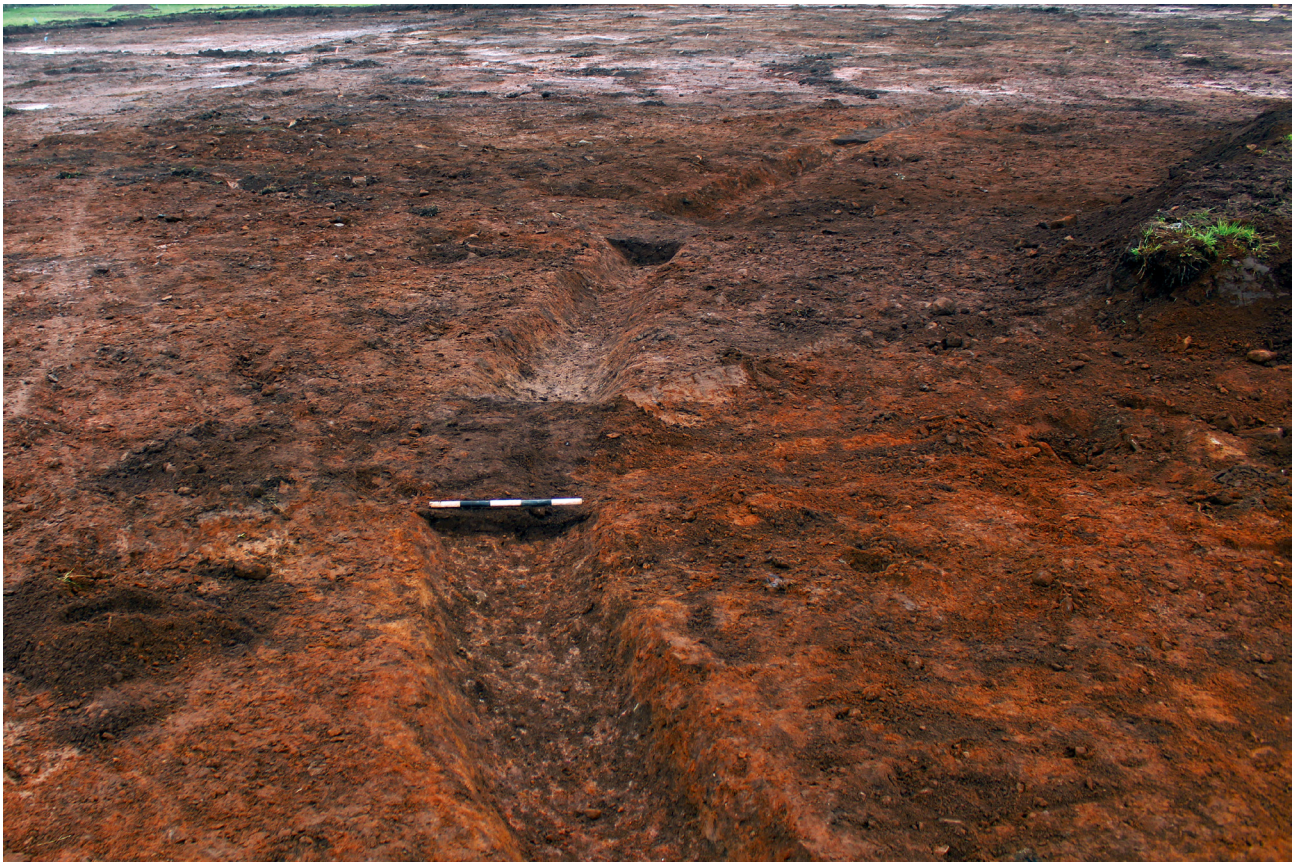
4.2.4 Curvilinear ditch

Approximately 17m to the north-east of the roundhouse was a curvilinear ditch C0042 (Illus 3). The ditch measured approximately 25m in length and up to 0.7m in width and formed a 90-degree arc in plan.

The ditch ranged in depth between 0.15m in its central area and only 0.03m at its northern and western extents, where it was presumably truncated by later ploughing. In the well-preserved central area, its profile was steep sided with a flat base (Illus 14). The ditch contained a sandy silt fill ranging in colour from mid-reddish-brown to mid-greyish-brown. A sherd of undiagnostic prehistoric pottery was recovered from the western end of the ditch.

4.2.5 Pit alignments

Approximately 20m north of curvilinear ditch C0042 were two pit alignments forming a possible enclosure (Illus 1 & 15; Table 4). The northern alignment measured 4m long and comprised four pits aligned roughly north-east/south-west; it potentially continued beyond the northern limit of excavation. The southern alignment measured 6m long and comprised five pits aligned roughly east/west (Illus 15). The pits were sub-circular in plan with steep sides and flat or rounded bases measuring between 0.35m and 0.65m in diameter and up to 0.3m in depth. The fills ranged between loose mid-reddish-brown silty sand and loose mid-



Illus 14 South-west-facing view of curvilinear ditch

Illus 15 West-facing view of the pit alignment forming the north-east/south-west orientated stretch

Table 4 Details of the individual features forming the pit alignments

Pit	Length (m)	Width (m)	Depth (m)	Plan/Profile	Fill
North-east/south-west alignment					
0106	0.67	0.50	0.23	Sub-circular plan. Curved base and sides	0107 Friable mid-greyish-brown coarse sandy silt
0108	0.65	0.38	0.30	Sub-circular plan. Curved base and sides	0109 Friable mid-greyish-brown fine sandy silt
0110	0.68	0.63	0.30	Circular plan. Curved base and sides	0111 Friable mid-greyish-brown fine sandy silt with rare charcoal
0104	0.60	0.46	0.32	Sub-circular plan. Curved base and sides	0105 Loose mid-greyish-brown clayey fine sand
North-west/south-east alignment					
0102	0.48	0.48	0.30	Circular plan. Flat base and vertical side	0103 Compact mid-reddish-brown silty coarse sand with rare charcoal
0100	0.62	0.50	0.29	Circular plan. Curved base and sides	0101 Loose mid-reddish-brown silty coarse sand with rare charcoal
0098	0.65	0.61	0.23	Circular plan. Curved base and sides	0099 Loose mid-reddish-brown silty coarse sand
0096	0.39	0.39	0.13	Circular plan. Curved base and sides	0097 Compact mid-reddish-brown silty coarse sand with rare charcoal
0094	0.43	0.43	0.09	Circular plan. Flat base and steeply sloping sides	0095 Compact mid-brown silty coarse sand

greyish-brown clayey sand. No dating evidence was recovered from the fills of the pits.

4.2.6 Other features

Eight undated pits and four isolated post holes were also identified in Area A. No evidence of date or function for these features was recovered.

4.3 Post-medieval activity

Activity on site during the medieval or post-medieval period was evidenced by traces of ridge and furrow ploughing as well as by the presence of pit C0161. Evidence of medieval or later agricultural activity was formed by two NNE/SSW aligned furrows in the south-eastern corner of Area A (Illus 1 & 3). To the east of these were a series of north/south field drains, which cut elements of the roundhouse, the fenced enclosure and the souterrain (Illus 7).

Pit C0161, located at the north-west of Area A (Illus 3), was sub-oval in plan with gently sloping sides and a flat base. It measured 2.4m in length, 1.4m in width and 0.6m in depth. The pit was notable for its large size compared to those recorded elsewhere on site and for the large number of medium–large sub-angular and sub-rounded stones (Illus 16) which were present in its basal fill, C0162. A fragment of charcoal from this fill returned a radiocarbon date of cal AD 1500–1790 (95.4% probability; SUERC-98341). The upper fills of the pit (C0163 and C0164) also had evidence of burnt material which had been redeposited into the pit, with environmental evidence indicating the presence of burnt turves. No other pit recorded on site had comparable depositional patterns and it is possible that the pit was used to deposit stones following field clearance activities.

Two furrows were noted in the south-eastern part of Area A (Illus 1& 3). They are evidence of rig and furrow agricultural systems and could date to the medieval or post-medieval periods. Their orientation corresponds with the orientation of the rig and furrow indicated in roughly the location of the excavation area on Roy's survey of the Lowlands (Roy 1747–1755).

Illus 16 West-facing section of pit C0161

4.4 Finds

This section discusses the prehistoric pottery, and stone finds and associated materials. A small assemblage of modern pottery, glass and ceramic building material (CBM) was also recovered. These include a small fragment of modern whiteware pottery, from post hole C0202, part of the fenced enclosure, as well as a fragment of undiagnostic colourless glass from post hole C0020, which is part of the roundhouse structure. Found also in relationship to the roundhouse, in post hole C0014, were 11 small flakes of brick or tile with a modern date. These finds likely derive from modern disturbance, perhaps associated with the installation of the field drains. These finds are not discussed further in the following section, but detailed reports are available in the archive report (McFarlane 2020). Most of the assemblage was associated with the roundhouse structure, its surrounding fence and the adjacent souterrain.

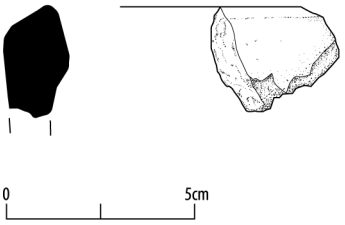
4.4.1 Prehistoric pottery

Beverley Ballin Smith

A total of 95 sherds (732g) of prehistoric pottery was retrieved from 11 features. The majority of the sherds (66, 69.5% by count; 512g, 69.9% by weight) were found in features associated with the souterrain. All the pottery from the site was examined using a 6X hand lens and weighed. Where both surfaces of sherds were present, the sherd thickness was measured. The diameters of rim sherds from a single vessel from the souterrain have been amalgamated to determine its approximate diameter and its percentage survival (see Table 2).

The general conclusion concerning this pottery is that visually it all looks very similar, and it is difficult to distinguish separate wares from the inclusions in the clay because of the almost consistent use of similar rock/minerals and vegetable temper.

The majority of the assemblage comprises body sherds, as expected, with only six rim sherds, fragments less than 10 × 10mm, and no base sherds. There are general observations: the mineral temper added to the clay is very similar across all sherds, indicating the use of easily exploitable, nearby volcanic rocks such as those forming the bedrock in the vicinity of the site and the town of

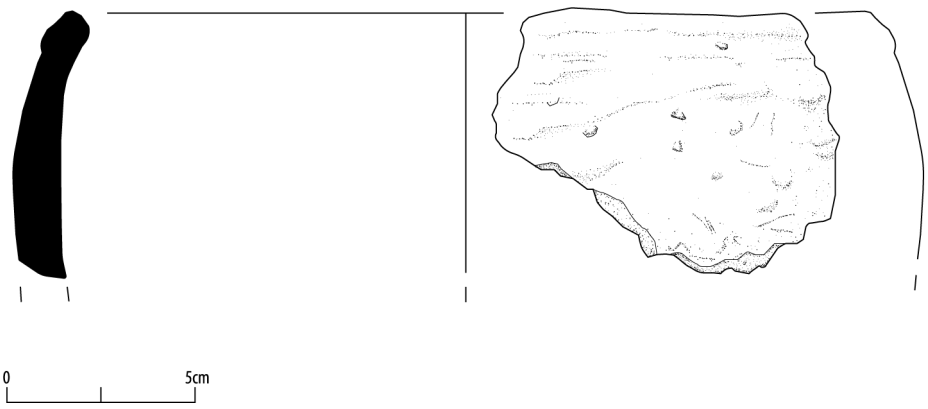


Illus 17 Pottery vessel rim from fill C0027 of post hole C0026 related to the roundhouse

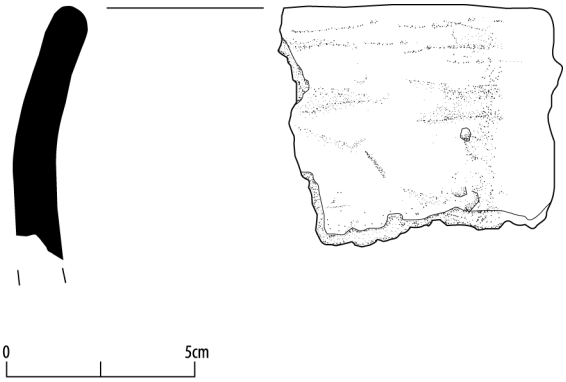
Mauchline (NERC 2024). A few sherds also include quartz sand, with some coal and mica, suggesting the exploitation of superficial deposits forming the subsoil, possibly exposed in the sides or bed of a stream. The subsoil would also have provided clay for the manufacture of the pottery. Organic temper, from straw or dried grasses, is identified in most sherds and is responsible for the occasional surviving grass marks on the pottery.

The use of the same or similar resources over time for the manufacture of this assemblage of pottery indicates that there is very little distinction between temper in sherds found in the different features. However, it must be noted that the body sherds recovered from the fills C0082 and C0083 of pit C0081 in the northern part of Area A contain predominantly quartz rock and quartz sand, as opposed to igneous rocks. A Middle Neolithic radiocarbon date range of 3530–3370 cal BC (95.4% probability; SUERC 98340) was returned from one of a number of hazelnut shells found within the pit fill. It suggests that the body sherds from it are likely to be of the same date – the earliest of the site.

Another noticeable characteristic of the pottery is the poor moulding and finishing of the vessels. Finger indentations are noted on many of the sherds which, given the coarse to very coarse grains of rock temper, were not smoothed completely away. In most sherds, rock temper shows through the surface of the sherds, and this might be deliberate, or simply a product of wear and abrasion of the clay around the harder grits. Rim sherds appear to be badly moulded, and their profiles are variable. The finishing of many of the external surfaces of sherds has largely been lost, in some cases by severe abrasion and burning causing it to flake off. However, where exterior surfaces survived in reasonable condition, it was noted that attempts



Illus 18 Pottery vessel rim from fill C0212 of souterrain chamber slot C0178



Illus 19 Pottery vessel rim from fill C0278 of souterrain chamber slot C0178

were made to smooth the vessels. Due to the size of rock temper most of the sherd thicknesses are in excess of 10mm, suggesting the vessels were heavy and robust, and probably intended as cooking vessels. Carbonised food remains and sooting are common on surfaces and reinforce that view.

The rim from fill C0027 of post hole C0026, is an unusual form (Illus 17). It is triangular in shape with a chamfer to the interior and one to the exterior. The latter ends at a slightly bulbous portion of the rim, from which there is a short but slight concavity for the neck of the vessel. The largest body sherd was smoothed out with surviving finger moulding marks; sooting or carbonised food deposits are present; and the sherd is burnt.

A radiocarbon sample from post hole C0028, one of the posts that formed the ring of structural timbers forming the main structure of the roundhouse, provided a Middle Bronze Age date range of 1405–1225 cal BC (95.4% probability; SUERC 98337). The post hole contained a single plain and undistinguished body sherd that is also likely to be Bronze Age in date.

The pottery from the souterrain fills (Illus 18 & 19) and from a post hole at its base is very similar and suggests one or more broken vessels became mixed in with the backfilling material, or possibly the use of the feature. The (non-joining) misshapen rim sherds of the only vessel identified (from fills C0212, C0278 and C0177) are poorly moulded. The rim is heavily worn on its top, but a bulge is present on its interior surface. A finger depression below the rim externally also created an uneven bulge of clay. This is not a cordon, but the product of poor moulding, which is also noted on the vessel body, where finger depressions and grass marks are clearly seen. The indication of the vessel diameter of *c* 210mm with *c* 25% of it surviving is only a guide, as the rim sherds are too irregular for an exact measurement. One of the sherds from secondary fill C0212 (not illustrated), the natural infilling of the souterrain, provided sufficient internal carbonised food residues to yield a Middle Bronze Age radiocarbon date range of 1490–1295 cal BC (95.4% probability; SUERC 98342). This date partly overlaps with another Middle Bronze Age radiocarbon date range of 1505–1415 cal BC (95.4% probability; SUERC 98339) from another sample S157 of natural infill within the souterrain, which also contained two pieces of pottery and one fragment of clay or daub.

Neolithic pits are often found on sites with later occupation, indicating the reuse of specific

landscapes over time, such as that at Hillhouse, South Ayrshire (Green et al 2021). The occurrence of a roundhouse of Middle Bronze Age date with associated pottery in East Ayrshire is mirrored in adjoining areas, such as that at Colinhill, South Lanarkshire (Spence 2019), and these buildings are increasingly commonly found due to the impact of modern developments. There is also the tendency to find pottery (often rims) and lithics ('special' artefacts) in selected post holes of roundhouses, including those forming the entrance or the porch. There is growing evidence to suggest deliberate or structured deposition, such as at Colinhill (ibid: 37).

4.4.2 Lithics

Julie Lochrie

The lithic assemblage comprises 13 pieces and was retrieved from post hole C0014, associated with roundhouse C0031, cuts C0145, C0174 and C0178 located within souterrain C0173, and pit C0161.

The lithics are made from small pieces of chert, flint or chalcedony/agate, which suggests a lack of flint resources nearby and more convenient access to chert. All the lithics are small pieces of debitage, meaning they have been struck from the stone and not worked any further. There is no indication of what may have been made or what their dating is, although they are certainly prehistoric.

The low level of lithics retrieved might suggest a very small amount of sporadic lithic production. The small size of the pieces makes it probable they have moved around through redeposition or bioturbation, and may therefore be residual.

4.4.3 Coarse stone

Fiona McGibbon & Julie Franklin

Two stone finds, a cobble tool and a possible pot lid, were found associated with the souterrain. The tool, from the usage layer C0167 within the souterrain, was an elongated greywacke water-worn cobble, rhomboid in cross-section, most likely sourced from local drift deposits. The shape is natural but has perhaps been intentionally selected for its utility as a whetstone or rubber. One of the two opposing flat surfaces has a waxy dark brown surface deposit, perhaps from use as a burnisher of some sort. One of the broader orthogonal sides has abundant scratches, mainly parallel to the long direction of the specimen, but there are also some diagonal scratches across the face, and a few that nick the top edge are cross cutting. The abundance of scratches on this surface and near absence on the opposite side suggest this is not natural abrasion but use wear.

The possible pot lid, from fill C0204, the final fill of the souterrain, is a flat piece of arkosic sandstone, again probably sourced from local drift. It is 18mm thick, chipped into a disc 116mm in diameter. It utilises the natural bedding of the lithology, with the two faces appearing natural, and has been minimally modified to achieve the rough circular shape. Adhering to one surface are some pieces of iron corrosion, which were at first thought to represent an iron object which may have corroded in proximity to the stone. However, microscopic examination showed these to be metalliferous globules, a spatter of spheres, one of which contains vesicles (gas bubbles). These are not an original feature of the lithology and look like spattering of molten metal or slag, potentially spat out from a metalworking hearth. These metallic deposits are not abundant, but they suggest that the object was present in the vicinity of metalworking activity and may have been used in the workshop. Given the limited evidence for metalworking on site, it is unclear whether this activity was taking place within any of the excavated features (see 4.4.5 'Industrial waste' below).

4.4.4 Fired clay

Julie Franklin

A total of 43 sherds (104g) of fired clay were retrieved from post holes C0008, C0020, C0026 and C0034, associated with the roundhouse, cuts C0166 and C0178 located within the souterrain, and pit C0161. The fragments are generally small and formless, with a few having a burnt surface. Their original function is unclear, and they may derive from a hearth, oven, pit lining, or wattle and fired clay structure.

4.4.5 Industrial waste

Julie Franklin

Slag and magnetic residues totalling 6g were retrieved from 11 features, including those associated with the roundhouse, the enclosure and the souterrain.

The slag is typically lightweight and vitrified and is characteristic of fuel ash slag. Fuel ash slags are created by burning in the presence of siliceous material and can be created in domestic hearths or ovens or can occur naturally. The magnetic residues comprise mostly magnetised gravels, which again are indicative only of burning and can occur naturally. A single possible slag sphere was retrieved from deposit C0154 in souterrain C0173. Slag spheres are created during iron smithing or smelting, though when found singly, as here, are not indicative of metalworking in the immediate vicinity. These accompany the traces of metalworking residues on the stone disc found in the final fill of the souterrain (see 4.4.3 'Coarse stone' above).

4.5 Environmental analysis

Laura Bailey

Analysis of the environmental assemblage, consisting of 79 bulk samples, revealed few findings of note. Charred cereal grains were present in small amounts in 21 deposits and were generally abraded and poorly preserved. Identifiable grains included barley (*Hordeum* sp), hulled barley (*Hordeum vulgare*), bread/club wheat (*Triticum aestivum* subsp *Compactum*) and emmer wheat (*Triticum dicoccum*). The largest number of grains, between 8 and 25 and between 6 and 15 respectively, were present in samples <133> and <157>. Both samples were taken from the usage layer of the souterrain's entrance passage, fill C0167. Among the cereals in these samples were barley, hulled barley, club/bread wheat and indeterminate grains. Emmer wheat was most abundant in the fill of post hole C0032, which was related to the roundhouse structure. Sample <110> from this fill contained between 6 and 15 grains (Bailey 2020).

Of particular note was an assemblage of wholehazelnuts and kernels, preserved by charring, and charred remains of crab apples were recovered. Whole hazelnuts (*Corylus avellana*) and charred crab-apple (*Malus sylvestris*) pericarp (the fruit components of crab apple), endocarp (core) and seeds were recovered from the fills of a pit C0081. Radiocarbon dating of whole hazelnuts from this feature returned a Neolithic date of 3530–3370 cal BC (95.4% probability; SUERC-98340). Charred hazel kernels and crab-apple pericarp are extremely rare in the archaeological record (Bishop et al 2014: 55; Bishop 2019), as both are generally consumed without the need to come into contact with fire. The recovery of these, together in the same feature, provides an interesting insight into the Neolithic economy.

Hazelnut shell is one of the most frequent wild food remains recovered from sites of prehistoric date in Europe (Bishop 2019: 1). Hazelnuts are rich in fat, protein (Dickson & Dickson 2000: 257) and other essential vitamins and nutrients and would have formed an important source of nutrition in prehistory. Hazelnut shell is the unwanted waste product after the nut is consumed, so it is likely to have been deliberately discarded onto domestic fires, or used as kindling (Bishop et al 2009: 79). The quantity of hazelnuts recovered and the presence of wholenuts and kernels at Mauchline suggest that the nuts have been the product of roasting, for storage perhaps, or accidental charring during crop processing rather than from the disposal of the shells onto a fire. In order to understand the conditions and circumstances that led to the preservation of this material at Mauchline, the hazelnut and kernel remains were compared with the results of modern charring experiments on hazelnuts (Bishop 2019) and experimental hazelnut roasting (Mithen 2001; Mithen & Score 2000).

The fragmentation of the hazelnuts and nutshell were quantified using the methodology detailed in Bishop (2019: 10) and compared to the results of recent experimentation. Five fragment size categories were used to represent the nut proportions present; 100% represents a complete nut, 50% is equal to 50–99% of a wholenut, 25% equates to 25–49% of a wholenut, 12.5 % equals 12.5–24% of a complete nut, and the remaining smaller fragments were recorded in the <12.5% category. The weight of each size class was also recorded (Table 5).

Together, the fills of pit C0081 contained 118 whole hazelnuts (50.4g) and multiple hazelnut fragments. Many of the hazelnuts were in excellent condition with the exterior shell surface intact and unworn. Although many of the shells were broken, all were relatively unabraded. Charring was visible on both the exterior and interior surfaces of the fragmented nutshells.

Fourteen charred hazelnut kernels were also recovered from fill C0082 (Table 6), the uppermost

fill of pit C0081; the number of kernels present was comparatively small given the large number of nutshells recovered. The survival of kernels in the archaeological record is extremely rare (Bishop 2019: 14). Kernels are edible components and would therefore only have been charred accidentally. It is thought that hazelnuts may have been roasted prior to consumption (Bishop et al 2014), in order to preserve them for storage, facilitate processing, aid digestion and for portability (Mithen 2001). Hazelnuts may have been roasted in shallow pits (Holst 2010), depressions or hollows, covered with sediment, with a fire lit on top (Mears & Hillman 2007: 26) and left to burn out (McClatchie 2018: 194). Recent experimentation has shown that roasting hazelnuts in this way transforms the kernels into a potato-like food that preserves well (Mears & Hillman 2007: 27).

Experimentation has shown that kernels char and remain whole only under an extremely limited range of conditions: in reducing conditions and when charred at low temperatures for short periods of time (Bishop 2019: 16). Experimental roasting of hazelnuts has shown that when whole nuts are charred the kernel tends to be of no value and becomes charred (Bishop 2019) or disintegrates into a greasy pulp when the nut is open (Mithen & Score 2000). Therefore, it is unlikely that the charred wholenuts at Mauchline were cracked open to recover the kernels for consumption (Bishop 2019: 14), which explains the presence of whole, uncracked nuts and charred kernels.

Fragments of crab apples (*Malus sylvestris*) were also present, represented by 18 apple pips and 39 fragments of endocarp and pericarp (1.5g). Crab apples contain several nutritionally valuable compounds, including pectin, malic and citric acids, and minerals including potassium, magnesium, phosphorous, calcium and iron (Mears & Hillman 2007: 222). Crab apples are bitter and are best roasted (Mabey 1996: 201), baked (Mears & Hillman 2007: 222) or dried (Dickson & Dickson 2000: 201) prior to consumption.

Charred crab-apple remains have been recovered at a few Scottish Neolithic sites. By 2009 crab apple had been recorded at only five Scottish Neolithic sites (Bishop et al 2009: 89). Crab-apple pericarp fragments and pips were recovered from the Neolithic timber hall at Balbridie (Fairweather & Ralston 1993: 321). Whole hazelnuts and a large number of carbonised crab-apple pericarp and pips were recovered together at Dubton Farm in Angus (Cameron et al 2002), a site containing Neolithic pits and souterrains dating to the Iron Age. The remains of these wild foods were found with cereal chaff and a large concentration of weed seeds, and together has been interpreted as evidence for a specialised plant-processing site (Church 2002: 52), with the crab apple and hazelnuts becoming incidentally charred during drying for storage (Bishop et al 2009: 84). Similarly, hazelnut and numerous fragments of crab-apple endocarp and seeds were recovered from the Mesolithic site

Table 5 Summary of hazelnut and nutshell from samples 120 and 119

Context	Sample	100%	50% (50–99%)	25% (25–49%)	12.5% (12.5–24%)	<12.5%	Total
0083	120	23 (8.7g)	19 (3.7g)	45 (5.3g)	151 (9.7g)	240 (10.2g)	478 (37.6g)
0082	119	95 (41.7g)	87 (17.8g)	382 (35.2g)	554 (27g)	31 (1.8g)	799 (123.5g)
Total		118 (50.4g)	106 (21.5g)	427 (40.5g)	705 (36.7g)	271 (12g)	1277 (161.1g)

Table 6 Summary of hazelnut kernels from fill C0082

Context	Sample	100%	50% (50–99%)	25% (25–49%)
0082	119	5 (0.2g)	7 (0.3g)	2 (<0.1g)

of Staosnaig on the isle of Colonsay (Mithen 2001).

The archaeobotanical assemblage from Mauchline provides valuable information on the Neolithic economy, both locally and regionally, with only a few comparable assemblages being found in Scotland. The presence of crab apples, together with hazelnuts, would imply late-summer to autumn gathering of wild foods and activity on the site. It is possible the crab apples and hazelnuts may have been collected during the autumn, and roasted or dried for storage (Renfrew 1973: 139; Bishop et al 2009: 83), and become accidentally charred during this process. During excavation no evidence of in situ burning or heat-affected soil was apparent within the pit from which the material was recovered. However, several small to medium (up to 25mm in diameter), unabraded, non-oak roundwood branches and twigs were recovered from the deposit. This suggests either that the charcoal may have been incorporated into the deposit from a fire lit on top of the pit, or that the material was processed nearby, accidentally burnt and the burnt residue from roasting was dumped into the pit together with the fuel wood. A similar situation was recorded at Derragh (Bunce 2018: 203), where the features were not identified as hazelnut roasting pits during excavation, but ash deposits were recorded throughout the site, which would be consistent with removal of the hearth atop the pit prior to unearthing the roasted nuts. In the case of the complete nut kernels and whole hazelnuts at Mauchline, it is likely that, based on analogy with modern experiments, the material was burned, perhaps beneath the ashes of a fire, at a moderate temperature (below 500°C) for a short period of time, which suggests that it was accidentally charred during roasting.

4.6 Waterlogged wood analysis

Michael Bamforth

4.6.1 Introduction

A wooden post SF176 was recovered from the fill of post hole C0287 which was situated within the souterrain. The wood was situated in waterlogged deposits which created the anaerobic conditions necessary for organic preservation.

4.6.2 Methodology

The system of categorisation and interrogation developed by Taylor (1998) and the condition scale developed by the Humber Wetlands project (Van de Noort et al 1995: table 15.1) have been adopted throughout. The item has been identified as oak (*Quercus* sp) based on characteristics visible with a ×10 magnification hand lens.

4.6.3 Results

The wooden post was recovered from one of the larger post holes and was one of a pair forming part of the timber lining or roof support of the souterrain.

The post is formed of a single piece of oak measuring 180 × 98 × 65mm. The top has degraded away, and the object is in poor condition, the outer surfaces being markedly soft and degraded with frequent radial cracks. The condition is below the threshold for confident analysis of woodworking technology.

The post currently appears as a modified radial quarter conversion. It is unclear if this represents the full original extent of the post or if other sections have degraded or broken away. The angular surface at the base suggests the end has been trimmed to length from one direction with an edged tool, probably an axe.

The post is formed of slow-grown, straight-grained oak heartwood and is derived from a parent timber with a diameter in excess of 130mm. Where visible the growth rings measure *c* 1.5–2mm with an estimated 35 annual rings present (too few to be a suitable candidate for dendrochronology). The slow growth rate and straight grain suggest the wood may be derived from a tree growing in relatively dense woodland.

4.6.4 Discussion of waterlogged wood analysis

Oak is a common tree that grows in stands and mixed woodland and will also tolerate damp soils. It is an easily worked and hard-wearing wood that splits readily in both planes (Wilson & White 1986). Oak occurs ubiquitously throughout the prehistoric and historic period as an excellent structural timber, including use in wet settings such as well linings and revetments (Gale & Cutler 2000).

This post presents as radial quarter split oak, trimmed to length at the base with an axe. The form, taxon and woodworking can all be considered typical of the Iron Age date normally attributed to souterrains, but in this case has a Bronze Age date. The post is of sufficient size to have supported the hypothesised timber lining and roof of the souterrain.

5. DISCUSSION

The excavation carried out at Mauchline provides valuable insights into the prehistoric period of East Ayrshire, particularly the Middle Bronze Age. It also highlights the challenges of producing chronologies for archaeological sites where stratigraphic relationships and material for dating are lacking, or the security of the context of datable material is poor, and the excavators rely on the rather contestable notion of spatial association between features to date them. The Neolithic activity is discussed first, followed by the chronology and then the interpretation of the Bronze Age settlement.

5.1 Neolithic activity

The role of Neolithic pits has long been the subject of discussion, and interpretations of the function of pit deposition have been much debated. They can be seen as evidence of domestic settlement or symbolic structured actions, or neither one nor the other (Brophy & Noble 2012: 63). Neolithic pits were recorded at two sites 400m apart in Monkton, 13.5km west of Mauchline. The evidence of the cluster of pits at one site was interpreted as 'straddling the domestic/ritual interpretation' (Rennie 2015: 27), whereas the evidence of the cluster at the other site was interpreted merely as an indicator of settlement (Dalland 2004: 4).

At Mauchline the poor quality of the pottery sherds from the Neolithic pit precludes any interpretations regarding the symbolic significance of the act of deposition. The environmental assemblage provides more confident evidence of the activities of the Neolithic inhabitants of the site. The intact nature of the assemblage recovered from the deposits is exceptional and, along with the recovery of crab-apple seeds from these fills, provides a valuable and interesting insight into the diet of the people using this landscape in the Neolithic. While hazelnut shells are frequently recovered from sites of prehistoric date in Europe (Bishop 2019), the preservation of both whole hazelnuts and charred kernels is more unusual. As discussed above (see 4.5 'Environmental analysis'), the presence of the latter is suggestive of accidental charring during roasting. This material, along with the crab-apple seeds and sherds of pottery, was subsequently deposited into a pit and taken as a whole reflect a one-off consumptive event, or alternatively waste from the drying out or roasting of perishable foodstuffs. This event, given the presence of both crab apples and hazelnuts, is likely to have occurred in the autumn.

Given the relative dearth of other Neolithic material, it is probable that this reflects a one-off seasonal event rather than sustained occupation. As mentioned in the pottery analysis above (see 4.4.1 'Prehistoric pottery'), clusters of prehistoric pits can be interpreted as the reuse of specific locations over time (for example Arabaolaza 2019: 34; Spence 2019: 32). The evidence of the pit and the small lithics assemblage from Mauchline demonstrates the presence of humans in the landscape, and the nature of the evidence indicates one-off events, namely flint knapping and food consumption. Similar evidence for such temporary activities in this period comes from other sites excavated in the region such as Hillhouse Farm (Green et al 2021) 5km north of Mauchline, Ayr Academy (Arabaolaza 2019) 15km south-west, Maidenhill (Kilpatrick 2021) 26km north, and Colinhill (Spence 2019) 26km north-east of Mauchline. In each case the Neolithic evidence was part of a palimpsest of activities from multiple periods.

5.2 Middle Bronze Age activity

During the Bronze Age there is evidence for more permanent occupation of the site, in the form of a fenced enclosure, a roundhouse and a souterrain. The curvilinear ditch and the pit-defined enclosure cannot be dated, and whether they are contemporary with the roundhouse or form part of a later or even earlier phase of occupation is unknown. On the basis of the radiocarbon dates obtained from the fills of the post pipes, the roundhouse can be dated to the Middle Bronze Age. The souterrain also appears to date to the Middle Bronze Age on the basis of the radiocarbon dates obtained from the material recovered from the basal fills and the preserved oak post. In addition, the souterrain's location relative to the roundhouse, where access to the chamber was made through an entrance between two posts of the post ring, strongly suggests the roundhouse and souterrain were contemporary. This would make the Mauchline example the oldest scientifically dated souterrain excavated in mainland

Scotland, a claim which will be further explored in the following section (see 5.3.1 'The souterrain'), which reviews the data for each of the settlement components, highlighting their chronology and local comparanda.

5.3 The roundhouse

Located within the north-western half of the fenced enclosure was a post-built roundhouse, comprising a post ring measuring 7.5m in diameter formed of nine post holes spaced approximately 2m apart (Illus 4). There was no evidence of an outer ring groove, outer porch, or internal features as seen in some other excavated roundhouses in Scotland; this may be due to the truncation of the features by modern ploughing. There was also no evidence of any of the post holes having been repaired or replaced, suggesting the roundhouse may only have been occupied for a short period before being abandoned. The presence of post pipes in five of the post holes suggests that at least part of the structure was left in situ following its abandonment. A 12m-wide gap in the south-east of the post ring was observed between post holes C0008 and C0026. The gap could be the result of localised truncation, but it is suggested that, although no clear evidence of an entrance to the roundhouse was identified, an entrance may have been located in this south-eastern section. South-east-facing entrances are widely noted across examples of Middle Bronze Age roundhouses, although there is a high degree of variation in orientations during the period (Pope 2003: 176; Cook & Dunbar 2008: 323).

The simple roundhouse structure, formed of a post ring to support a conical roof, is typical of the Middle Bronze Age, and is one of several known examples from across Scotland (see Pope 2015). Although limited, comparative examples are also known from East Ayrshire, with two Middle Bronze Age roundhouses excavated at Colinhill 26km to the north-east of Mauchline (Spence 2019). One of these, Structure A, was a post ring of seven post holes enclosed within a penannular ditch. The other (Structure B) was a post ring of 11 post holes with a four-post entrance structure. An Iron Age roundhouse with an associated souterrain excavated to the west at Brodick, Isle of Arran, appeared to be post-ring constructed but differed from the Mauchline example in that it may have had internal post holes (Williamson 2017: 29). A roundhouse dated to between 110 cal BC and cal AD 50 excavated at Monkton, 13km west of Mauchline, comprised a post ring and two separate outer ring grooves designed to support the outer walls of the structure (Rennie 2015). A roundhouse dated to between 37 cal BC and cal AD 120 was excavated in Ayr, South Ayrshire, approximately 16km south-west of Mauchline (Murray 2012). This example comprised segmented outer ring grooves designed to hold the outer walls of the structure with internal post holes. The differences in construction style between these roundhouses and the example excavated in Mauchline reflect both their different chronologies and the variety of roundhouse construction styles seen more commonly in the east and north-east of Scotland (Pope 2015).

The structural life of the Mauchline roundhouse could have lasted for up to 60 years (Pope 2003: 345), but its occupational life may have been significantly less. Archaeological work has highlighted the relatively short lifespans of these buildings (Barber & Crone 2001; Halliday 2007; Pope 2015). Within this model the Mauchline roundhouse may have been occupied seasonally or at least sporadically, with periods of abandonment in between. In this respect the presence of the souterrain is interesting, since it may have been used as storage for items that were neither transferable nor required by the occupiers of the roundhouse during periods of absence.

The two Middle Bronze Age structures at Colinhill (Spence 2019) and the Late Bronze Age roundhouse at Aird Quarry (Cook 2006), 80km south-west of Mauchline, offer comparators. These roundhouses showed greater preservation of features than Mauchline, despite both sites being subject to plough truncation. All contained evidence of the internal division of space, with hearths noted at Colinhill and pits in all. The roundhouse excavated on Brodick, Isle of Arran (which was dated to the 2nd century BC) was arguably more reminiscent of the Mauchline roundhouse but differed in that it could potentially have had internal posts.

The lack of similar roundhouses to Mauchline in East Ayrshire makes it difficult to infer whether there was a specific regional design of roundhouse and how the roundhouse excavated at Mauchline

would tie into such a pattern. Roundhouse form can be dependent on both the resources available to the builders and compliance with an ideal or traditional design (Pope 2015: 166), and interpretations of the finished structure on the basis of heavily truncated remains are limited. More widely, Pope posits a transition from the Early to Middle Bronze Age signified by a decline in upland and coastal settlements (2015: 177–8), and the location of the Mauchline roundhouse 15km west of the coast and 7km from the upland zone does not contradict this.

5.3.1 The souterrain

Closely related to the roundhouse were the remains of a souterrain, which could be contemporary with the roundhouse. Souterrains, typically dated to the Iron Age, are best described as cellars, an enclosed space either partly or completely underground and sealed by a roof, and are commonly associated with above-ground structures such as roundhouses. They are recorded throughout Scotland with a particular concentration in the east and north-east of the country. In south-west Scotland souterrains are rare and nearly all are known from aerial photography only. Two souterrains are located in Garphar, South Ayrshire (NRHE ID 80241) approximately 25km south-west of Mauchline, two possible examples are identified at Ballantrae Bridge (NRHE IDs 142407 and 142623) 60km south-west of Mauchline, and one souterrain was observed at Cairn Connell Hill (NRHE ID 81599) 75km south-west of Mauchline. All are broadly typical of the 'crescent shaped' design of the souterrain seen at Mauchline (Brophy & Cowley 2005: 61, 66). One souterrain, with an Iron Age date, was excavated in association with a cluster of roundhouses at Cults Loch, Castle Kennedy in Dumfries and Galloway, some 77km south-west of Mauchline (Cavers & Crone 2018). This souterrain had a length of 9m, was 1.7m wide and had a maximum depth of 1.3m (ibid). These dimensions are very similar to those observed at Mauchline, but smaller than, for example, the souterrain at Glen Cloy on the Isle of Arran (NRHE ID 215297), which was also much more complex, comprising separate passages as well as evidence for a stone and timber lining (Williamson 2017). The paucity of souterrains recorded in the south-west of Scotland may suggest that such features were simply not as common in this area as in the east and north-east of the country. However, it may reflect a bias in the archaeological record, as the notably smaller scale of commercial development in the region results in far fewer opportunities to shed light on the archaeology through developer-funded archaeological projects (Cavers 2008: 13). The excavated examples from Mauchline and Cults Loch, and the examples identified on aerial photography, hint that these features formed an important facet of life in the south-west of the country and could be more numerous than previously thought.

In contrast to these examples, the evidence from Mauchline, in particular the radiocarbon dating, strongly indicates that the souterrain was Middle Bronze Age in date, contrary to the typical Iron Age date for such features. Souterrains throughout the Scottish Islands are generally thought to be a late Iron Age phenomenon (Dunwell & Ralston 2008: 116; ScARF 2012: Sect 5.8; Williamson 2017: 25). That said, the overall chronology of souterrains in themselves is problematic, with few scientifically dated examples (Coleman & Hunter 2002: 79; Anderson & Rees 2006: 56; Dunwell & Ralston 2008: 116). Recent excavations of souterrains, particularly in Angus, where the densest concentration of these structures is found, have provided scientific dating in the form of radiocarbon dates of material from basal fills. For example, material from the souterrains at Dubton Farm (Cameron et al 2002; Ginnever 2017) and Monifieth (Anderson & Rees 2006) all provided AMS dates between early 1st and early 3rd centuries AD. Material from the souterrain excavated at Brodick, the nearest regional comparator to Mauchline, provided a date between late 1st century BC and early 2nd century AD (Williamson 2017: 24).

In light of this, the dates from Mauchline push the origins of souterrains much further back than expected. The radiocarbon dating from the usage layers of the souterrain, as well as the dating of residue on a pottery sherd, provide the strongest evidence for this. While this discovery would be of national significance, it is important to take into account a number of potential caveats. Firstly, it is not impossible that the basal deposits within the souterrain represent a more extensive Middle Bronze Age layer which was truncated by the construction of the souterrain during the Iron Age

period. In such a case, the Bronze Age charcoal and pottery with Bronze Age food residue should be considered residual. A different thought questions the simultaneity of the roundhouse and the souterrain. It could be argued that the souterrain's location relative to the roundhouse is coincidental, and that accessing the Iron Age souterrain led to users treading fragments of alder charcoal, remnants of the Bronze Age roundhouse posts perhaps, into the basal fills of the souterrain. The fragment of pottery where the residue returned a Middle Bronze Age radiocarbon date could also have been an inclusion within the sediment that was eroded by natural processes into the souterrain. Thirdly, the waterlogged post is noted as formed from the heartwood of oak. The combination of oak as a long-lived species and heartwood – by definition older tissue within the tree that can be considered dead while the outer sapwood continues to grow – indicates a significant potential age offset from that given by the radiocarbon date. An Iron Age date for the timber's use in the souterrain can therefore not be discounted.

While these possibilities for a later date are acknowledged, given the absence of evidence for Iron Age activity, both in terms of artefacts and radiocarbon dating, these scenarios and a later date seem unlikely. Absence of evidence does not necessarily mean that no Iron Age activity took place on this site, but the statistical overlap between the dates from the souterrain and the roundhouse on balance favour a Middle Bronze Age date for the use of both features. In addition, the physical connection between the roundhouse and the souterrain is undeniable and highly unlikely to be coincidental. Instead, it more likely signals simultaneous use of both features.

Despite being highly unusual, an early date for a souterrain is not without parallels. A souterrain at Nessbreck, Corrigal, Orkney returned dates spanning the 19th to 18th centuries BC, suggesting that the early Mauchline date may not be an isolated phenomenon (Roberston 2007; Young 2016: appendix 3). Given the limited number of scientifically dated sites, it is clear that there are a number of lacunae in our understanding of the development of souterrains, but nevertheless the data from Mauchline and Nessbreck suggests their origins and development may extend earlier than the Iron Age.

Turning from questions of dating to structure, the Mauchline souterrain comprised a steep-sided cut, lined with a series of paired post holes, likely defining the superstructure of the souterrain. As noted previously, a souterrain in Brodick, Isle of Arran (NRHE ID 215297), provides the closest regional excavated comparison. That souterrain was notably larger and more complex, comprising separate passages as well as evidence for stone and timber lining (Williamson 2017).The presence of paired post holes cut into the base of the Mauchline souterrain was also noted during the excavation of another timber-lined souterrain associated with a roundhouse in Cyderhall, Sutherland, where paired post holes were interpreted as revetments for the walls and support for a timber-framed roof (Pollock 1993: 158). Timber-lined examples were seen at Redcastle, Angus (Alexander 2005) and Dalladies (Watkins 1980b), and stone-lined examples comprising multiple chambers were found at Dubton Farm, Angus (Ginnever 2017) and Shanzie Farm, Perthshire (Coleman & Hunter 2002). The Shanzie Farm souterrain was one of the largest at 35m in length, whereas the souterrains at Dubton Farm (Cameron et al 2002) measured between 7m and 4m long. The Mauchline souterrain was relatively simple in design though larger than the miniature souterrains at Dubton. At Cults Loch, the souterrain was also thought to be timber-lined but no internal post holes were discovered. The lining was assumed from the presence of a 30mm thick black, charcoal-rich sandy silt layer which covered the wall of the feature in the area around the entrance (Cavers & Crone 2018). The positioning of the Cults Loch souterrain also finds parallel with the example from Mauchline, being situated just to the north-west of the entrance into the roundhouse, providing direct access between the souterrain and the annular space between the ring groove and the post ring (Cavers & Crone 2018: 13).

The function of souterrains has been widely debated and interpretations range from defensive structures, a popular antiquarian explanation (Armit 1999: 582), to animal shelters (Wainwright 1963). They are broadly considered in current discourse to have been used for storage, as the cool and dark conditions would have been suitable for storing foodstuffs as well as other items, although it has been argued that there was also a ritual dimension to their

use (Hingley 1992: 29). The storage interpretation seems most appropriate in the case of Mauchline, as the souterrain would have provided a convenient place to store food and other items. The relatively small size of the souterrain perhaps reflects the modest form of the roundhouse. In light of this, it seems unlikely that the souterrain would have been used to store food for a wider community, as was postulated for the substantial souterrain excavated at Newmill, Perthshire (Watkins 1980a: 199), and it is likely to have served a small family group inhabiting the roundhouse.

At some point, the Mauchline souterrain appears to have been abandoned, with the majority of the timber frame and roof dismantled, although at least part of one of the posts was left in situ. In contrast to the deliberately infilled souterrains excavated at Dalladies, Newmill (Watkins 1980a; 1980b) and Redcastle (Alexander 2005), the Mauchline souterrain underwent a period of natural infilling following its abandonment. Although there was evidence of deliberately infilled stones in the southern central portion of the souterrain, this deposit overlay approximately 0.3m of naturally infilled basal deposits, showing that the deposition of the stones took place sometime following the abandonment of the feature. It is possible this relates to later field clearance activities after the settlement was abandoned. Armit (1999) identified a pattern of deliberately deconstructed and backfilled souterrains in the east of Scotland during the later Iron Age, and it is interesting to note that this earlier example of a souterrain from the south-west of the country does not conform to this model.

5.3.2 The fenced enclosure

The fenced enclosure which enclosed both the roundhouse and the souterrain is a notable discovery. Few examples of such a clearly defined fenced enclosure encircling a roundhouse are recorded, particularly in the south-west of Scotland. Tentative fence lines associated with roundhouses were identified outside House 7 and House 9 in Dryburn Bridge, East Lothian (Dunwell 2007: 68–9). The fence line associated with House 7 provides the example closest to that seen at Mauchline. In this example, a foundation slot was present to the south-east of the roundhouse, with a possible entrance close to the entrance to the roundhouse itself. It is possible that the fence line from House 7 and that at Mauchline fulfilled similar functions. A palisade enclosure around a Late Bronze Age roundhouse was also recorded at Aird Quarry (Cook 2006), 80km south-west of Mauchline.

It is possible that the fenced enclosure was used either as an additional barrier from prevailing winds or, more likely, to contain or exclude livestock, or to display the social status of the inhabitants. The enclosure respects the roundhouse and the souterrain and provides a larger space to the front (south-east) of the roundhouse than to the back. This positioning of the roundhouse relative to the enclosure may have been deliberate – either to provide a large space in which to undertake communal or agricultural activities, or in order to emphasise the space in front of the roundhouse and thus enhance the status of the structure (and its inhabitants). It is noted that there was no evidence in the excavation to indicate that the roundhouse had any significant status. Any of the gaps in the fenced enclosure could be the result of plough truncation or could indicate the presence of entrances to the enclosure. An entrance giving access to the larger space of the forecourt is more likely than an entrance to the rear, and the gaps either side of post hole C0050 are both candidates.

Although the fence lines identified outside House 7 and House 9 in Dryburn Bridge, East Lothian (Dunwell 2007: 68–9) are the closest comparable examples to the Mauchline example, they differed in their date, construction style, and positioning. The fence line associated with House 7 comprised a foundation slot and was present only at the south-east of the roundhouse. The fence line potentially associated with House 9 was formed of a single line of pits present only at the north of the roundhouse.

5.3.3 The curvilinear ditch and pit alignments

The curvilinear ditch and pit alignments at the north-east of the site demonstrate the demarcation of the wider area, perhaps to manage livestock, and are evidence of a variety of methods used to demarcate the land. Isolated curvilinear ditches can be enigmatic features on archaeological sites, with varying interpretations ascribed to them. The curvilinear feature west of House 3 at Dryburn

Bridge, for example, was interpreted as a possible windbreak or shelter (Dunwell 2007: 69). While such an interpretation cannot be ruled out in this case, it is also possible that the ditch was used to define an area, perhaps for livestock management.

The L-shaped pit-defined enclosure at the north-east of the site may have fulfilled a similar function. Interpretations of the function of pit alignments have ranged from the prosaic, such as management of livestock, to more symbolic or ritual in nature (Cameron & Mitchell 2010: 25). The pit alignments excavated at Langside and Castlesteads located north of Dalkeith, for example, spanned a considerable distance and have been interpreted as symbolic and physical boundaries which demarcated large blocks of land (Cameron & Mitchell 2010: 28). Houses 7 and 8 at Dryburn Bridge, East Lothian, both had potential pit alignments associated with them and were interpreted as possibly demarcating garden plots or boundaries around the roundhouses (Dunwell 2007: 68–9). The Mauchline example seems to fit more closely with the latter interpretation, given the modest extent of the alignment, although its distance 50m north-east of the roundhouse does not necessarily suggest a direct association.

6. CONCLUSION

The excavations at Mauchline have provided valuable insights into the domestic economy of the Middle Neolithic, through evidence of an event that took place one day in late summer / early autumn between 5,500 and 5,300 years ago – the raking of hearth material into pit C0081. More significant evidence of Middle Bronze Age settlement was also identified. Such settlement is rare in south-west Scotland and so the Mauchline roundhouse and fenced enclosure are notable discoveries. Furthermore, the Middle Bronze Age souterrain is unique in mainland Scotland and its date pushes the development of souterrains further back than previously thought. Taken as a whole, the data from Mauchline provides important insights into the development of Middle Bronze Age settlement in this region, an area of research which to date has been underrepresented.

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8. REFERENCES

Alexander, D 2005 'Redcastle, Lunan Bay, Angus: the excavation of an Iron Age timber-lined souterrain and a Pictish barrow cemetery', *Proc Soc Antiq Scot* 135: 41–118. https://doi.org/10.9750/PSAS.135.41.118

Anderson, S & Rees, A R 2006 'The excavation of a large double-chambered souterrain at Ardownie Farm Cottages, Monifieth, Angus', *Tayside and Fife Archaeological Journal* 12: 14–60.

Arabaolaza, I 2019 'ARO33: Beside the River Ayr in prehistoric times: excavations at Ayr Academy', *Archaeology Reports Online* 33. https://www.archaeologyreportsonline.com/PDF/ARO33_Ayr_Academy.pdf. Accessed 28 January 2020.

Armit, I 1999 'The abandonment of souterrains: evolution, catastrophe or dislocation?' *Proc Soc Antiq Scot* 129: 577–96. https://doi.org/10.9750/PSAS.129.577.596

Bailey, L 2020 'Environmental Assessment', *in* McFarlane, F 'Kilmarnock Road, Mauchline, East Ayrshire. Assessment Report on Archaeological Excavation', unpublished archive report, Headland Archaeology.

Barber, J & Crone, A 2001 'The duration of structures, settlements and sites: some evidence from Scotland', *in* Raftery, B & Hickey, J (eds) *Recent Developments in Wetland Research*, 69–86. Department of Archaeology, University College Dublin, Monograph Series, Vol 2 (WARP Occasional Paper 14).

Bishop, R R 2019 'Experiments on the effects of charring on hazelnuts and their representation in the archaeological record', *Journal of Archaeological Science: Reports* 26: 1–17.

Bishop, R R, Church, M J & Rowley-Conwy, P A 2009 'Cereals, fruits and nuts in the Scottish Neolithic', *Proc Soc Antiq Scot* 139: 47–103. https://doi.org/10.9750/PSAS.139.47.103

Bishop, R R, Church, M J & Rowley-Conwy, P A 2014 'Seeds, fruits and nuts in the Scottish Mesolithic', *Proc Soc Antiq Scot* 143: 9–71. https://doi.org/10.9750/PSAS.143.9.71

Bowman, D 1990 *Radiocarbon Dating*. Berkeley: University of California Press.

Bronk Ramsey, C 2021 *OxCal v4.4.4*. https://c14.arch.ox.ac.uk/oxcal. Accessed 20 March 2023.

Brophy, K & Cowley, D 2005 *From the Air: Understanding Aerial Photography*. Cheltenham: The History Press.

Brophy, K & Noble, G 2012 'Within and beyond pits: deposition in lowland Neolithic Scotland', *in* Anderson-Whymark, H & Thomas, J (eds) *Regional Perspectives on Neolithic Pit Deposition: Beyond the Mundane*, 63–76. Oxford: Oxbow Books.

Bunce, A 2018 'Hazelnuts from Derragh', *in* McGlynn, G, Stuijts, I & Stefanini, B (eds) *The Quaternary of the Irish Midlands*, 200–7. Irish Quaternary Association Field Guide. Ireland: Irish Quaternary Association.

Cameron, K & Mitchell, S 2010 'Castlesteads and Langside pit alignments', *in* Cameron, K, Cressey, M, Dunwell, A, Mitchell, A, Rees, A, Strachan, R & Suddaby, I 'Excavations on the Route of the Dalkeith Northern Bypass, 1994–95 and 2006', *Scottish Archaeological Internet Reports* 44. https://doi.org/10.9750/issn.2056-7421.2010.44

Cameron, K, Church, M, Cressey, M, Jackson, A, MacSween, A, Thoms, J & Warren, G 2002 'The excavation of Neolithic pits and Iron Age souterrains at Dubton Farm, Brechin, Angus', *Tayside and Fife Archaeological Journal* 8: 19–76.

Cavers, G 2008 'The later prehistory of "black holes": regionality and the south-west Scottish Iron Age', *Proc Soc Antiq Scot* 138: 13–26. https://doi.org/10.9750/PSAS.138.13.26

Cavers, G & Crone, A 2018 *A Lake Dwelling in Its Landscape: Iron Age Settlement at Cults Loch, Castle Kennedy, Dumfries & Galloway*. Oxford: Oxbow Books.

Church, M 2002 'Carbonised plant macrofossils', *in* Cameron, K, Church, M, Cressey, M, Jackson, A, MacSween, A, Thoms, J & Warren, G 'The excavation of Neolithic pits and Iron Age souterrains at Dubton Farm, Brechin, Angus', *Tayside and Fife Archaeological Journal* 8: 19–76.

Clarke, J & Wilson, A 1960 'The road into Ayrshire, Dumfriesshire and Galloway', *Natural History & Antiquarian Society* (3rd series) 37: 143–50.

Coleman, R & Hunter, F 2002 'The excavation of a souterrain at Shanzie Farm, Alyth, Perthshire', *Tayside and Fife Archaeological Journal* 8: 77–101.

Cook, M 2006 'Excavations of a Bronze Age roundhouse and associated palisade enclosure at Aird Quarry, Castle Kennedy, Dumfries and Galloway', *Transactions of the Dumfriesshire and Galloway Natural History and Antiquarian Society* (3rd series) 80: 9–28.

Cook, M & Dunbar, L 2008 *Rituals, Roundhouses and Romans. Excavations at Kintore, Aberdeenshire 2000–2006.* Vol 1: *Forest Road*. Edinburgh: Scottish Trust for Archaeological Research.

Dalland, M 2004 'Results of an archaeological watching brief and excavation at Baird Road, Monkton, Ayrshire', unpublished client document, Headland Archaeology.

Dickson, C & Dickson, J 2000 *Plants and People in Ancient Scotland*. Gloucestershire: Tempus.

Dunwell, A 2007 'Cist burials and an Iron Age settlement at Dryburn Bridge, Innerwick, East Lothian', *Scottish Archaeological Internet Reports* 24. https://doi.org/10.9750/issn.2056-7421.2007.24

Dunwell, A & Ralston, R 2008 *Archaeology and Early History of Angus.* Stroud: Tempus.

Fairweather, A D & Ralston, A B M 1993 'The Neolithic timber hall at Balbridie, Grampian Region, Scotland: the building, the date, the plant macrofossils', *Antiquity* 67: 313–23.

Fitzpatrick-Sinclair, A 2019 'Kilmarnock Road, Mauchline, East Ayrshire. Assessment Report on Archaeological Trial Trenching', unpublished archive report, Headland Archaeology.

Gale, R & Cutler, D 2000 *Plants in Archaeology*. Otley: Westbury Publishing.

Ginnever, M 2017 'An Iron Age settlement and souterrain at Dubton Farm East, Brechin, Angus', *Tayside and Fife Archaeological Journal* 23: 1–12.

Green, K, Alldritt, D, Ballin, T, & Sheridan, A 2021 'ARO44: Exceptional pots: the early Neolithic of Hillhouse Farm, Kilmarnock, South Ayrshire', *Archaeology Reports Online* 44. https://www.archaeologyreportsonline.com/PDF/ARO44_HillhouseFarm.pdf. Accessed 28 January 2020.

Halliday, S P 2007 'Unenclosed roundhouses in Scotland: occupation, abandonment, and the character of settlement', *in* Burgess, C, Topping, P & Lynch, F (eds) *Beyond Stonehenge: Essays on the Bronze Age in honour of Colin Burgess*, 49–56. Oxford: Oxbow Books.

Hingley, R 1992 'Society in Scotland from 700 BC to AD 200', *Proc Soc Antiq Scot* 122: 7–53. https://doi.org/10.9750/PSAS.122.7.53

Holst, D 2010 'Hazelnut economy of early Holocene hunter-gatherers: a case study from Mesolithic Duvensee, northern Germany', *Journal of Archaeological Science* 37: 2871–80.

Kilpatrick, M 2021 'ARO46: A well-trodden path: the prehistoric landscape of Maidenhill, Newton Mearns, East Renfrewshire', *Archaeology Reports Online* 46. https://www.archaeologyreportsonline.com/PDF/ARO46_Maidenhill.pdf. Accessed 28 January 2020.

Mabey, R 1996 *Flora Britannica.* London: Sinclair Stevenson.

McClatchie, M 2018 'A study of the archaeobotanical remains from Late Mesolithic deposits at Derragh, Lough Kinale, Co. Longford, Ireland', *in* McGlynn, G, Stuijts, I & Stefanini, B (eds) *The Quaternary of the Irish Midlands*, Irish Quaternary Association Field Guide, 188–99. Ireland: Irish Quaternary Association.

McFarlane, F 2020 'Kilmarnock Road, Mauchline, East Ayrshire. Assessment Report on Archaeological Excavation', unpublished archive report, Headland Archaeology.

Mears, R & Hillman, G 2007 *Wild Food.* London: Hodder & Stoughton.

Mithen, S 2001 'Plant use in the Mesolithic: evidence from Staosnaig, Isle of Colonsay, Scotland', *Journal of Archaeological Science* 28: 223–34.

Mithen, S J & Score, D 2000 'Experimental roasting of hazelnuts', *in* Mithen S (ed) *Hunter–Gatherer Landscape Archaeology: The Southern Hebrides Mesolithic Project 1988–1998*, 507–12. Cambridge: McDonald Institute.

Murray, R 2012 'South East Ayr, Corton, Ayr: Results of Archaeological Excavation', unpublished archive report, Headland Archaeology.

Natural Environment Research Council (NERC) 2024 *British Geological Survey Geology Viewer*. https://geologyviewer.bgs.ac.uk/. Accessed 1 August 2021.

Pollock, R W 1993 'The excavation of a souterrain and roundhouse at Cyderhall, Sutherland', *Proc Soc Antiq Scot* 122: 149–60. https://doi.org/10.9750/PSAS.122.149.160

Pope, R 2003 'Prehistoric Dwelling: Circular Structures in North and Central Britain

c 2500 BC – AD 500', unpublished PhD thesis, University of Durham Department of Archaeology.

Pope, R 2015 'Bronze Age architectural traditions: dates and landscapes', *in* Hunter, F & Ralston, I B M (eds) *Scotland in Later Prehistoric Europe*, 159–84. Edinburgh: Society of Antiquaries of Scotland.

Reimer, P, Austin, W, Bard, E, Bayliss, A, Blackwell, P, Bronk Ramsey, C et al 2020 'The IntCal20 Northern Hemisphere radiocarbon age calibration curve (0–55 cal kBP)', *Radiocarbon* 62: 725–57.

Renfrew, J M 1973 *Palaeoethnobotany: The Prehistoric Food Plants of the Near East and Europe*. London: Methuen.

Rennie, C 2015 'ARO14: Pits, pots and pitchstone: excavation of a multi-phase site at Main Street, Monkton', *Archaeology Reports Online* 14. https://www.archaeologyreportsonline.com/PDF/ARO14_Monkton.pdf. Accessed 28 January 2020.

Robertson, J 2007 'Ness Breck Corrigall: rescue excavation', *Discovery and Excavation in Scotland* 8: 138.

Roy, W 1747–1755 *Roy Military Survey Strip 4 (Lowlands)* Section 6e. https://maps.nls.uk/view/217499578. Accessed 24 March 2023.

ScARF 2012 Hunter, F & Carruthers, M (eds) *Iron Age Panel Report*, Scottish Archaeological Research Framework. Edinburgh: Society of Antiquaries of Scotland. https://scarf.scot/wp-content/uploads/sites/15/2015/12/ScARF%20Iron%20Age%20Sept%202012.pdf. Accessed 24 March 2023.

Spence, B 2019 'ARO35: Neolithic pits and Bronze Age settlement at Colinhill, Strathaven', *Archaeology Reports Online 35*. https://www.archaeologyreportsonline.com/PDF/ARO35_Colinhill.pdf. Accessed 28 January 2020.

Taylor, M 1998 'Wood and bark from the enclosure ditch', *in* Pryor, F M M (ed) *Etton: Excavations at a Neolithic Causewayed Enclosure near Maxey, Cambridgeshire, 1982–87*, 115–59. London: English Heritage Archaeological Reports 18.

Van de Noort, R, Ellis, S, Taylor, M & Weir, D 1995 'Preservation of archaeological sites', *in* Van de Noort, R & Ellis, S (eds) *Wetland Heritage of Holderness: An Archaeological Survey*, 1st edition, 341–56. Hull: Humber Wetlands Project.

Wainwright, F T 1963 *The Souterrains of Southern Pictland*. London: Routledge.

Watkins, T 1980a 'Excavation of a settlement and souterrain at Newmill, near Bankfoot, Perthshire', *Proc Soc Antiq Scot* 110: 165–208. https://doi.org/10.9750/PSAS.110.165.208

Watkins, T 1980b 'Excavation of an Iron Age open settlement at Dalladies, Kincardineshire', *Proc Soc Antiq Scot* 110: 122–64. https://doi.org/10.9750/PSAS.110.122.164

Williamson, C 2017 'A dark and mysterious place: excavations of an Iron Age settlement at Auchrannie, Brodick', *Scottish Archaeological Journal* 39: 1–34.

Wilson, K & White, D J B 1986 *The Anatomy of Wood*. London: Stobart.

Young, H 2016 'Extending the Cultural Biographies of Scotland's Souterrains', unpublished undergraduate thesis, University of the Highlands and Islands.