ARCHAEOLOGICAL SERVICES
DURHAM UNIVERSITY

on behalf of
Altogether Archaeology

Dry Burn enclosure near Garrigill Cumbria

post-excavation full analysis

report 4042
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Durham University

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1. Summary

The project

1.1 This report presents the full analysis results of an archaeological excavation undertaken on a possible prehistoric enclosure at Dry Burn near Garrigill, Cumbria. Two trenches and a test pit were excavated on the site.

1.2 The works were commissioned by Altogether Archaeology and conducted by volunteers from Altogether Archaeology with training and supervision provided by Archaeological Services Durham University.

Results

1.3 The excavation confirmed the unusual construction of a double-ditched circular enclosure, with banks on either side of each ditch, and an entrance on the south side. Neither the artefactual or palaeoenvironmental remains were able to provide evidence regarding the date or purpose of the structure.

1.4 The primary fill of the outer ditch and an early deposit beneath its associated outer bank returned radiocarbon date ranges of 2200-2030 cal BC and 2280-2050 cal BC respectively. These similar date ranges indicate that the outer bank was constructed in the Early Bronze Age.

1.5 Material beneath a subtle outer bank associated with the inner ditch returned a radiocarbon date range of 800-560 cal BC, indicating early Iron Age activity on the site.

1.6 An upper fill of a deep channel cut through the south entrance of the enclosure returned a radiocarbon date range of 250-400 cal AD. This may indicate activity on the site during the Romano-British period. However, this channel may be associated with water running downhill from the south.

2. Project background

Location (Figure 1)

2.1 The site is located at Dry Burn, near Garrigill, Cumbria (NGR centre: NY 722 424). The enclosure is situated between the Dry Burn and the Little Dry Burn, immediately south of the road between Leadgate and Garrigill.

Objective

2.2 The research objectives of the project were outlined in the project design (Altogether Archaeology 2013). The project aimed to provide a better understanding of the form of the Dry Burn enclosure, hopefully linked to dating evidence for its initial construction, subsequent use and eventual abandonment. This included establishing if the site is Neolithic, and if so, from what phase of the Neolithic; if it is not Neolithic, then to establish the period from which it does date. The results were intended to be of intrinsic value, and to also provide a basis for possible future conservation, interpretation and research.

Project design

2.3 The works have been undertaken in accordance with a project design provided by the Historic Environment Officer/Altogether Archaeology Project Officer (North Pennines AONB Partnership) (Altogether Archaeology 2013).

Dates

2.4 Fieldwork was undertaken between 3rd and 12th August 2013. This report was prepared for February 2016.

Personnel

2.5 Fieldwork was conducted by Nathan Thomas, Rebekah Watson and Matthew Claydon (supervisor). This report was prepared by Matthew Claydon, with illustrations by David Graham. Specialist reporting was conducted by Jennifer Jones (artefacts) and Dr Carrie Drew (palaeoenvironmental). The Project Manager on behalf of Archaeological Services was Peter Carne, who edited this report. Overall project management and coordination was by Paul Frodsham (ANOB), and overall academic direction by Professor Chris Scarre.

Archive/OASIS

2.6 The site code is **GDB13**, for **G**arrigill **D**ry **B**urn 20**16**. The archive is currently held by Archaeological Services Durham University and will be transferred to Tullie House Museum or Penrith Museum by agreement with the Cumbria County Archaeologist in due course. Archaeological Services Durham University is registered with the **O**nline **A**cces**S** to the **I**ndex of archaeological investigation**S** project (**OASIS**). The OASIS ID number for this project is **archaeol3-239437**.

Acknowledgements

2.7 Archaeological Services Durham University is grateful for the assistance of the landowner and the volunteers of Altogether Archaeology in facilitating this scheme of works.

3. Landuse, topography and geology

3.1 At the time of this assessment, the proposed development area comprised a field of pasture.

3.2 Clear earthworks comprising two concentric ditches with associated banks survive. They are situated on the north-facing slope of Rotherhope Fell between the Dry Burn and Little Dry Burn at approximately 350m OD.

3.3 The underlying solid geology is the Scar Limestone of the Lower Carboniferous Middle Limestone Group.

4. Historical and archaeological background

Previous archaeological works

4.1 The earthwork at Dry Burn has been known about locally for many years. It was brought to the attention of Paul Frodsham (Altogether Archaeology Project Manager) by local historian Alastair Robertson in 2009, as a possible site for AA project fieldwork. At this time it was identified as a possible Neolithic monument, with the earthworks very well preserved due to lack of more recent agricultural or industrial activity on the site. Other earthworks were also noted, including two 'cross ridge dykes' across the ridge to the south.

4.2 The site was subsequently recorded by English Heritage as part of the Miner-Farmer project, which used a range of techniques to record the field archaeology of Alston Moor. A detailed large-scale topographic survey of the earthworks at Dry Burn was followed by a LIDAR survey and geophysical survey (Payne 2011).

4.3 The Dry Burn site appears to consist of two roughly circular concentric ditches with outer banks. The inner ditch, surrounding the central platform, is *c*.50m in diameter; the outer ditch is *c*.80m in diameter. Although the ditches generally survive in very good condition, the central platform appears to have been disturbed at some point, though the nature and date of this disturbance are unknown. It is possible that one or more stone burial cairns were constructed here, which may themselves have subsequently been dismantled and the stone reused to build a settlement or sheepfold. The western half of the site appears better preserved than the east; the site is crossed by a drystone fieldwall, beyond which the ground appears to have slumped into the steep channel of the Dry Burn. The detailed earthwork and geophysical surveys by English Heritage have led to the suggestion that there may originally have been several gaps through the banks, and causeways across the ditches; such features are characteristic of earlier Neolithic 'causewayed enclosures' (Frodsham 2013, 7).

4.4 The English Heritage geophysical survey report classifies the site as a 'hengi-form enclosure', and the site is recorded on the Cumbria Historic Environment Record as a 'hengi-form enclosure' of prehistoric date (site number 6236).

5. The evaluation trenches

Introduction

5.1 Two trenches and one test pit were excavated over the enclosure (Figure 2).

Trench 1 (Figures 3 and 4)

5.2 This trench was 42m by 2m and was located radially from the centre of the enclosure extending westwards through the inner and outer ditch and bank. Natural subsoil, a yellow sandy clay [39] was reached at a depth of 0.2m.

Outer ditch and banks (Figures 5-7)

5.3 The outer ditch of the enclosure [F5: 2m wide, 0.6m deep] contained a primary fill of dark brown organic loam [16: 0.1m thick]. Radiocarbon analysis of charred nutshell from this deposit provided an early Bronze Age date range of 2200-2030 cal BC. This was overlain by a dark grey sand [15: 0.1m thick] containing frequent rounded stones. Over this was a deposit of light grey sand [10=14: 0.1m thick], above which was a brown organic loam [4=13: 0.1m thick]. There was evidence for a deliberately constructed bank on both sides of the ditch. The bank on the outside was approximately 3m wide. Excavation through the bank revealed a thin spread of grey clay [17: 0.05m thick] deposited over the natural subsoil. Over this was a layer of brown silty loam [12: 0.05m thick]. Radiocarbon analysis of birch charcoal from this deposit provided an early Bronze Age date range of 2280-2050 cal BC. A shallow depression F38: 0.5m wide, 0.05m deep] in the natural here was filled with similar material [18]. Over this was a yellow sandy clay [36: 0.15m thick]. This may be re-deposited natural subsoil up-cast from the original excavation of the ditch. The soil deposits buried beneath it may be remnants of buried topsoil and turf pre-dating the construction of the enclosure. The top of the bank to the bottom of the ditch measured 1.1m.

5.4 On the inside of the ditch, a bank of stones [F37: 3.5m wide, 0.25m high] had been built up, directly over the natural subsoil. The stones found near the bottom of the ditch probably fell from this bank.

5.5 East of the stone bank was a wide flat berm approximately 13m wide. No features were apparent across the berm, although there was a relatively dispersed spread of small stones towards the centre.

Inner ditch and banks (Figures 8-11)

5.6 The inner ditch [F7: 3m wide, 0.6m deep] contained a primary fill of grey clay [11=27: 0.35m thick]. This was overlain by a brown silty loam [6=28] containing organic material. Slight banks were evident either side of the ditch. On the outside (west), excavation through the bank revealed a thin spread of clayey silt [33: 0.05m thick]. This was covered by an orange-brown silty sand [35: 0.1m thick]. These deposits may be evidence of a buried soil horizon overlain by re-deposited natural formed by up-cast from the ditch. Radiocarbon analysis of alder charcoal from context 33 provided an early Iron Age date range of 800-560 cal BC. The inside bank also comprised a spread of orange-brown silty sand [34: 0.1m thick] overlying the natural. There were occasional stones in this material. No deposits were apparent beneath the bank. The top of the bank to the bottom of the ditch measured approximately 1m.

5.7 East of the bank was an inner berm approximately 5m wide. The inner edge of the berm was defined by a bank of stones [F3: 4m wide, 0.5m high]. Although there were similarities with bank F37, this bank contained several much larger stones (typically 0.4m by 0.3m by 0.25m). This clearly defined the internal platform of the

enclosure. Despite this platform being lower than the berm, there was no evidence beneath the stone bank for up-cast soil.

5.8 Several small sondages were dug into the natural clay beneath the banks and along the berms to confirm there was no evidence for further deposits buried below re-deposited natural. The trench was covered by heavy dark brown loam topsoil and turf [1: 0.2-0.3m thick].

Trench 2 (Figures 3, 12-13)

5.9 Trench 2 was 12m by 3m-5m and was located over a possible entrance on the south side of the enclosure. Natural subsoil, a mix of stones and yellow sand [30], was identified at a depth of 0.2m. This was cut by a ditch [F19: 2m wide, 0.8m deep] running down the hillside from the south-west to the north-east. It reflects a channel identified by the LIDAR survey. The ditch contained a primary fill of loose grey-brown stone and sand [20: 0.35m thick]. This was overlain by a deposit of loose yellow-brown sand [21: 0.1m thick] on the east side. This was overlain by a deposit of organic brown sandy silt [22=23: 0.15 thick]. Over this was a dark brown sandy silt [24=25: 0.25m thick]. The upper fill was a deposit of stones [26: 0.35m thick]. This ditch may have formed as a water channel running down the hillside, with a concentration of stones at the base and silty layers above. The final fill may reflect a deliberate act of backfilling the channel with stones. There was no direct stratigraphic relationship was the enclosure, although it respected the location of the outer bank and ditch. Radiocarbon analysis of birch charcoal from silt deposit 22 provided a Romano-British date range of 250-400 cal AD.

5.10 The north-west part of the trench was widened to try to locate the terminus of the outer ditch recorded in Trench 1. Very limited evidence for the ditch survived here. A subtle scoop [F31: 0.05m deep] was identified, filled with grey sandy clay [32]. The ditch did not extend across the trench; this evidence supports the hypothesis that this was an entrance.

5.11 The outer bank of the enclosure was visible as an earthwork. A sondage through the bank material did not encounter any evidence of buried soil. The bank material was a gritty yellow sand and stone [29: 0.15m thick].

5.12 The trench was covered by heavy dark brown loam topsoil and turf [2: 0.2-0.3m thick].

Test pit 1 (Figure 3)

5.13 This pit measured 1.2m by 1.2m and was located west of trench 2 to try and identify the terminus of the outer enclosure ditch. There was no evidence of the ditch within the test pit.

6. The artefacts

Bone analysis

Results

6.1 Two very small pieces of burnt/calcined bone (<1g wt) were recovered from sample <2> from context 10. These are too small to identify to species. An animal tooth fragment was identified in Context 4 sample <1>.

Building materials analysis

Results

6.2 Two very small abraded fragments of brick/tile (<5g wt) were found in context 1. These cannot be dated.

Iron objects analysis

Results

6.3 Context 1 produced part of the head and shank from a corroded, machine-cut iron nail 26mm long (SF14). This is of 19th/early 20th-century date. A small corroded circular head from a nail or stud 10mm diam was also found in context 1. One face is part-coated with a thick layer of red gloss paint. This is likely to be of 19th/20th-century date.

Wood fragment analysis

Results

6.4 A small fragment of partly-mineralised wood, *c*.25 x 19mm, with no original edges or faces, was found unstratified (SF10).

Industrial residues analysis

Results

6.5 The site produced residues from high temperature working, though none can be attributed to specific industrial processes.

6.6 A single fragment of coal (<3g wt) came from context 1, along with small fragments of cindered coal/coke (20g total wt) from context [1] SF2 and SF7 and context 3 SF15, and a very small fragment (<0.1g wt) from sample <13> context 15.

6.7 A total of 153g of fuel ash slag (FAS) was recovered from three contexts, all but 20g coming from context 1 – SF's 1, 3, 4, 5, 6, 8, 9, 12, 13, 17, 18, 22, and 26. Context 2 SF24 and context 8 (u/s) SF23 also produced single fragments.

6.8 Fuel ash slag is a lightweight, vesicular material of varying colour from white through to grey, black and green, which forms during combustion when the non-organic components of fuels react with silicates present in earth, stone or ceramic. Fuel ash slag contains a range of common earth elements including silica, iron, aluminium, sodium, phosphorus and potassium. It can form at temperatures achievable in a domestic fire or conflagration, and its presence is not necessarily indicative of industrial activity on a site.

6.9 However, this site also produced two small pieces (47g wt) of hard, probable building stone with traces of adhering fuel ash slag, which came from context 1 and context 2 (SF23). It is possible that the fuel ash slag fragments represent the removal of build-up from the walls of stone-built kilns or ovens.

Geology analysis

Results

6.10 A total of 555g weight of undateable fluorite fragments were hand-recovered from three contexts, all but 20g coming from context 1, including SF25. Contexts 3 and 8 [= u/s] produced the remainder. A further 125g wt of fragments were recovered from environmental samples from contexts 10 sample <2>, context 12 sample <4>, context 15 sample <13>, context 16 sample <14>, context 17 sample <5>, context 20

sample <7>, context 27 sample <15>, context 28 sample <16> and context 33 sample <17>.

6.11 The pieces are all small, up to *c.*43 x 36 x 28mm, and are mainly white/brown in colour. The fragments may have been deliberately broken, but the regular crystal cleavage planes of the material precludes confirmation of this.

Discussion

6.12 As well as being used for ornamental purposes, fluorite was used in industrial processes as a flux to lower the melting point of materials needing high-temperature melting, such as in the steel industry, and it is possible that the fluorite was destined for nearby steel works. Alternatively, as fluorite is found where there are geological deposits of the lead ore galena - common in Wear valley - the fluorite may represent waste from lead production, although the site did not produce any definitive archaeological evidence for the smelting or processing of lead.

6.13 Two fragments of yellow limestone rock (135g wt) came from context 1, SF11 and context 3, SF16. They have no worked surfaces and cannot be dated.

7. The palaeoenvironmental evidence

Methods

7.1 A palaeoenvironmental assessment was carried out on 18 bulk samples, taken from ditch fills and soil horizons associated with the enclosure. The samples were manually floated and sieved through a 500μm mesh. The residues were examined for shells, fruitstones, nutshells, charcoal, small bones, pottery, flint, glass and industrial residues, and were scanned using a magnet for ferrous fragments. The flots were examined at up to x60 magnification using a Leica MZ6 stereomicroscope for waterlogged and charred botanical remains. Identification of these was undertaken by comparison with modern reference material held in the Environmental Laboratory at Archaeological Services Durham University. Plant nomenclature follows Stace (1997). Habitat classifications follow Preston *et al.* (2002).

7.2 Selected charcoal fragments were identified, in order to provide material suitable for radiocarbon dating. The transverse, radial and tangential sections were examined at up to x600 magnification using a Leica DMLM microscope. Identifications were assisted by the descriptions of Schweingruber (1990) and Hather (2000), and modern reference material held in the Environmental Laboratory at Archaeological Services Durham University.

7.3 The works were undertaken in accordance with the palaeoenvironmental research aims and objectives outlined in the regional archaeological research framework and resource agendas (Petts & Gerrard 2006; Hall & Huntley 2007; Huntley 2010). Such frameworks have highlighted the scarcity of archaeobotanical evidence from prehistoric sites, with the number of sites and quantities of material recognised as small (Hall & Huntley 2007).

Results

7.4 The presence of uncharred roots was noted in many of the samples. Charred diffuse-porous root wood was also noted in contexts from the outer enclosure bank [12, 17

and 18]. Fragments of quartz, insect/beetle remains and small amounts of charcoal were present in several of the samples. The charcoal was in poor condition, with many fragments having a vitrified appearance or having mineral inclusions. A small fragment of fuel ash slag was recovered from ditch fill [24]. An animal tooth fragment was noted in context [4] with a trace of calcined bone also present in context [10]. Uncharred wood and vegetative material was present in a number of the samples including [4], [11], [23] and [28]. Charred botanical remains comprised an indeterminate seed in ditch fill [24] and fragments of hazel nutshell in contexts [16] and [18]. Small fragments of alder and birch charcoal and a few charred heather twigs were also noted. The results are presented in Tables 1.2-1.4.

Discussion

7.5 The samples provide little information about the age of the features or settlement activities at the site due to the small size and poor condition of the charcoal assemblages and the near absence of charred plant macrofossils. The vitrified condition of the charcoal, with radial cracks noted, suggests burning at high temperatures. The limited quantity of other charred plant remains is difficult to interpret, but the presence of charred hazel nutshell and small quantities of charcoal indicates the presence of anthropogenic activity during a period when the ditches were open. Interpretatively limited charred plant macrofossil assemblages including charred hazel nutshell fragments are often a feature of prehistoric sites (Hall & Huntley 2007). The general absence of charred plant macrofossils and identifiable charcoal prevents further interpretation of diet, crop husbandry practices and fuel use at the site.

7.6 The presence of uncharred *Cenococcum geophilum* (soil fungus) sclerotia in many of the samples is not diagnostic of particular environmental conditions. *Cenococcum geophilum* is a mycorrhizal fungus which can form on the roots of an extremely wide variety of tree species and which can be present across a range of different soil types (Hrenko *et al.* 2009) and which may survive in the soil for long periods of time (Benedict 2011). The soil fungus forms a symbiotic relationship with tree root systems, and so may indicate the former presence of trees at the site.

7.7 The charred root wood recovered from outer bank deposits (contexts [12], [17] and [18]) may potentially be associated with ground clearance by burning prior to the construction of the enclosure, with the woody roots burnt *in situ*. The presence of a few charred heather twigs in a small number of contexts may similarly derive from clearance burning. While some trees and shrubs may have existed at the site, the pre-enclosure landscape is unlikely to have comprised dense woodland as a summary of the pollen evidence from sites in the North Pennines AONB indicates major clearance of woodland took place in the region from the Neolithic period onwards with low tree pollen values recorded at most sites by the later Bronze Age (Huntley 2011).

7.8 The current environmental conditions at the site largely consist of relatively damp rough bracken, heath or grassland. Such environs may have facilitated the preservation of uncharred plant macrofossils and wood through the presence of waterlogged conditions. The uncharred plant macrofossils present generally reflect similar habitats, with wet ground indicators such as sedges, lesser spearwort and blinks seeds present. Uncharred seeds were particularly prevalent in the secondary fills of the outer ditch which may indicate that this feature was more

waterlogged/damp than the other areas considered. Uncharred macrofossils from wide habitat niches were also present, including thistles, grasses and buttercup. The secondary fill [context 15] from outer ditch F5 contained a single example of crowfoots. This group of aquatic plants includes species which grow on wet mud and in still or flowing water (Stace 1997). The low occurrence of these remains, with an absence of other aquatic plants, suggests damp marshy conditions within the ditch rather than the presence of standing water. The infilling of the ditch with organic material may have taken place after the site was abandoned.

7.9 Waterlogged wood was present in several contexts and predominantly comprised of well-preserved birch root wood with bark, with fragments of this recovered from context [28] <16>, [4] <1> and [11] <3>. Medium-sized birch root wood was particularly prevalent from context [11], which again suggests the former presence of some trees at the site. There was no evidence for working of these wood fragments. A fragment of hazel/alder roundwood, a piece of naturally-compressed and water-eroded wood of indeterminate species and a bark fragment also of indeterminate species were present in sample <18> from context [28]. Three hand-recovered wood fragments were also considered, and comprised a bark fragment from context [4] (small find 20), a small twig fragment from context [1] (small find 21) and a sliver of wood with possible charring and potential compression marks also from context [1] (small find 19), although evidence of anthropogenic modification is unclear. No original edges were present for this wood fragment, and the wood could not be identified to species.

8. Radiocarbon dating

8.1 AMS radiocarbon dating and calibration were carried out by the Scottish Universities Environmental Research Centre (SUERC), East Kilbride, Scotland. The analysis was undertaken on charred nutshell and charcoal from short-lived tree species. Details of the results and calibrations are presented in Appendix 3.

9. Discussion

9.1 The excavation confirmed the unusual construction of a double-ditched circular enclosure, with banks on either side of each ditch, and an entrance on the south side. Neither the artefactual or palaeoenvironmental remains were able to provide evidence regarding the date or purpose of the structure.

9.2 The primary fill of the outer ditch and an early deposit beneath its associated outer bank returned radiocarbon date ranges of 2200-2030 cal BC and 2280-2050 cal BC respectively. These similar date ranges indicate that the outer bank was constructed in the Early Bronze Age.

9.3 Material beneath a subtle outer bank associated with the inner ditch returned a radiocarbon date range of 800-560 cal BC, indicating early Iron Age activity on the site. It has been suggested that stonework at the centre of the structure may be evidence of a roundhouse, of possible Iron Age date (Paul Frodsham, pers. comm.). It may be therefore that the surviving earthworks were occupied as a domestic dwelling during the Iron Age.

9.4 An upper fill of a deep channel cut through the south entrance of the enclosure returned a radiocarbon date range of 250-400 cal AD. This may indicate activity on the site during the Romano-British period. However, this channel may be associated with water running downhill from the south.

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Appendix 1: Data tables

Table 1.1: Context data

The • symbols in the columns at the right indicate the presence of artefacts of the following types: M metals, I industrial residues, C ceramic building material,

No	Trench	Description	M	I	C
1	1	Topsoil	•	•	•
2	2	Topsoil		•	
3	1	Stone bank		•	
4	1	Fill of ditch F5			
F5	1	Outer ditch cut			
6	1	Fill of ditch F7			
F7	1	Ditch cut			
8	1	Void		•	
F9	1	Void			
10	1	Fill of ditch F5			
11	1	Fill of ditch F7			
12	1	Buried soil			
13	1	Fill of ditch F5			
14	1	Fill of ditch F5			
15	1	Fill of ditch F5			
16	1	Fill of ditch F5			
17	1	Clay deposit			
18	1	Depression fill			
F19	1	Cut of ditch			
20	2	Fill of ditch F19			
21	2	Fill of ditch F19			
22	2	Fill of ditch F19			
23	2	Fill of ditch F19			
24	2	Fill of ditch F19			
25	2	Fill of ditch F19			
26	2	Fill of ditch F19			
27	1	Fill of ditch F7			
28	1	Fill of ditch F7			
F29	2	Bank			
30	1 & 2	Natural subsoil			
F31	2	Ditch cut			
32	2	Fill of ditch F31			
33	1	Buried soil			
34	1	Bank			
35	1	Bank			
36	1	Bank			
F37	1	Bank			
F38	1	Depression			
39	1	Natural subsoil			

Table 1.2: Data from palaeoenvironmental assessment - Trench 1 outer ditch and bank features

Sample		**1**	**2**	**4**	**5**	**6**	**11**	**12**	**13**	**14**
Context		**4**	**10**	**12**	**17**	**18**	**13**	**14**	**15**	**16**
Feature number		**F5**	**F5**				**F5**	**F5**	**F5**	**F5**
Feature		**ditch**	**ditch**	**buried soil**	**clay deposit**	**depression**	**ditch**	**ditch**	**ditch**	**ditch**
Material available for radiocarbon dating		(✓)	(✓)	✓	✓	✓	-	-	-	✓
Volume processed (l)		8	15	33	18	7	4	4	3	3
Volume of flot (ml)		2200	1000	1700	400	80	620	275	100	190
Residue contents										
Bone (calcined)	indet. frags	-	(+)	-	-	-	-	-	-	-
Calcium carbonate precipitate		-	-	-	(+)	-	-	-	-	-
Clinker / cinder		-	-	-	-	-	-	-	(+)	-
Quartz		-	++	+	+	-	-	-	+	+
Tooth (animal - enamel fragment)		1	-	-	-	-	-	-	-	-
Wood		++	-	-	-	-	-	-	-	-
Flot matrix										
Charcoal		-	(+)	+++	+++	++	(+)	(+)	(+)	(+)
Coal / coal shale		-	(+)	-	+	(+)	(+)	-	-	+
Earthworm egg case		++	-	-	+	+	+	-	+	+
Heather twigs (charred)		-	-	+	(+)	-	-	-	-	-
Insect / beetle		++	(+)	-	+	-	-	+	+	++
Roots		++++	-	+++	++	+++	++	+	+++	+++
Uncharred vegetative material		+++	+	-	+	-	-	-	(+)	(+)
Wood		++	++	-	+++	-	-	+	-	(+)
Charred remains (total count)										
(t) *Corylus avellana* (Hazel)	nutshell frag.	-	-	-	-	1	-	-	-	6
Waterlogged remains (abundance)										
(q) *Ranunculus* subgenus *Batrachium* (Crowfoot)	achene	-	-	-	-	-	-	-	1	-
(t) *Rubus idaeus* (Wild Raspberry)	fruitstone	-	-	-	-	-	1	-	-	-
(w) *Carex* sp (Sedges)	biconvex nutlet	3	-	-	-	-	2	-	2	-
(w) *Carex* sp (Sedges)	trigonous nutlet	3	-	-	-	-	2	1	-	-
(w) *Montia fontana* (Blinks)	seed	3	3	-	-	-	1	2	-	-
(w) *Ranunculus flammula* (Lesser Spearwort)	achene	2	3	-	-	-	3	2	1	-
(x) *Cenococcum geophilum* (Soil fungus)	sclerotia	2	3	4	2	3	2	2	2	2
(x) *Cirsium / Carduus* sp (Thistles)	achene	4	1	1	-	-	1	-	1	-
(x) Poaceae undiff. (Grass family)	<1mm caryopsis	1	-	-	-	-	-	-	-	-
(x) Poaceae undiff. (Grass family)	>1mm caryopsis	-	-	-	-	-	-	-	1	-
(x) *Ranunculus* subgenus *Ranunculus* (Buttercup)	achene	3	1	-	-	-	-	-	2	-
(x) *Trifolium* sp (Clovers)	seed	-	-	-	-	-	1	-	-	-
(x) *Viola* sp (Violets)	seed	-	1	-	-	-	-	-	-	-

[q-aquatic; t-tree/shrub; w-wet/damp ground; x-wide niche. (+): trace; +: rare; ++: occasional; +++: common; ++++: abundant. Waterlogged remains are scored from 1-5 where 1: 1-2; 2: 3-10; 3: 11-40; 4: 41-200; 5: >200.
(✓) may be unsuitable for dating due to size or species]

Table 1.3: Data from palaeoenvironmental assessment - Trench 1 inner ditch and bank features

Sample		**3**	**15**	**16**	**17**	**18**
Context		**11**	**27**	**28**	**33**	**28**
Feature number		**F7**	**F7**	**F7**		**F7**
Feature		**ditch**	**ditch**	**ditch**	**bank**	**ditch**
Material available for radiocarbon dating		(✓)	✓	(✓)	(✓)	(✓)
Volume processed (l)		-	19	5	17	5
Volume of flot (ml)		200	255	110	140	250
Residue contents						
Charcoal		(+)	(+)	-	+	-
Quartz		-	+	(+)	(+)	-
Uncharred vegetative material		-	-	-	-	(+)
Wood		++++	-	++	-	++
Flot matrix						
Charcoal		+	++	(+)	+	(+)
Coal / coal shale		-	-	-	-	(+)
Earthworm egg case		++	(+)	-	+	+
Heather twigs (charred)		(+)	-	-	(+)	-
Insect / beetle		++	+	(+)	+	++
Roots		-	+++	+++	++++	-
Uncharred vegetative material		+++	-	+	+	(+)
Wood		++++	-	++	-	++
Waterlogged remains (abundance)						
(r) *Urtica dioica* (Common Nettle)	achene	-	-	-	-	1
(t) *Rubus fruticosus* agg. (Bramble)	fruitstone	-	-	-	-	1
(w) *Carex* sp (Sedges)	biconvex nutlet	1	-	-	-	-
(w) *Carex* sp (Sedges)	trigonous nutlet	-	-	-	1	-
(x) *Cenococcum geophilum* (Soil fungus)	sclerotia	3	2	2	-	2
(x) *Cirsium / Carduus* sp (Thistles)	achene	-	-	-	1	-
(w) *Montia fontana* (Blinks)	seed	1	-	-	1	-
(x) Poaceae undiff. (Grass family)	<1mm caryopsis	1	-	-	-	-
(x) Poaceae undiff. (Grass family)	>1mm caryopsis	-	1	-	-	-
(w) *Ranunculus flammula* (Lesser Spearwort)	achene	-	-	-	-	1
(x) *Ranunculus* subgenus *Ranunculus* (Buttercup)	achene	1	-	-	-	1

[t-tree/shrub; w-wet/damp ground; r-ruderal; x-wide niche.
(+): trace; +: rare; ++: occasional; +++: common; ++++: abundant
Waterlogged remains are scored from 1-5 where 1: 1-2; 2: 3-10; 3: 11-40; 4: 41-200; 5: >200
(✓) may be unsuitable for dating due to size or species]

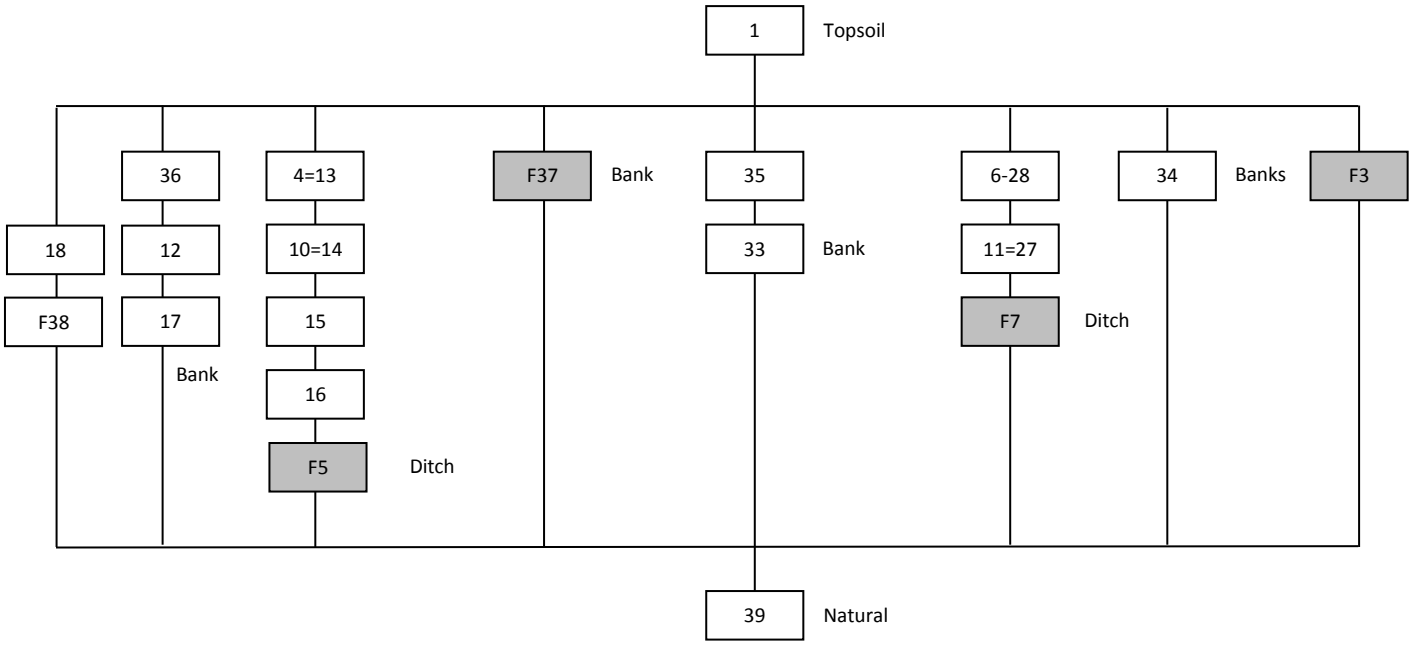
Table 1.4: Data from palaeoenvironmental assessment - Trench 2

Sample		**7**	**8**	**9**	**10**
Context		**20**	**22**	**23**	**24**
Feature number		**F19**	**F19**	**F19**	**F19**
Feature		**ditch**	**ditch**	**ditch**	**ditch**
Material available for radiocarbon dating		-	(✓)	-	(✓)
Volume processed (l)		13	5	3	9
Volume of flot (ml)		60	150	275	450
Residue contents					
Quartz		++	-	-	(+)
Flot matrix					
Charcoal		-	+	-	+
Coal / coal shale		-	(+)	-	-
Fuel ash slag		-	-	-	(+)
Heather twigs (charred)		-	(+)	-	-
Insect / beetle		-	+	+	-
Roots		++	-	-	-
Uncharred vegetative material		-	++	-	-
Wood		-	-	(+)	-
Charred remains (total count)					
(x) Indeterminate type	seed	-	-	-	1
Waterlogged remains (abundance)					
(w) *Montia fontana* (Blinks)	seed	1	1	2	-
(x) *Cenococcum geophilum* (Soil fungus)	sclerotia	1	2	3	2
(x) *Cirsium / Carduus* sp (Thistles)	achene	-	-	1	1
(x) Potentilla sp (Cinquefoils)	achene	-	2	-	-
(x) *Ranunculus* subgenus *Ranunculus* (Buttercup)	achene	-	-	1	-

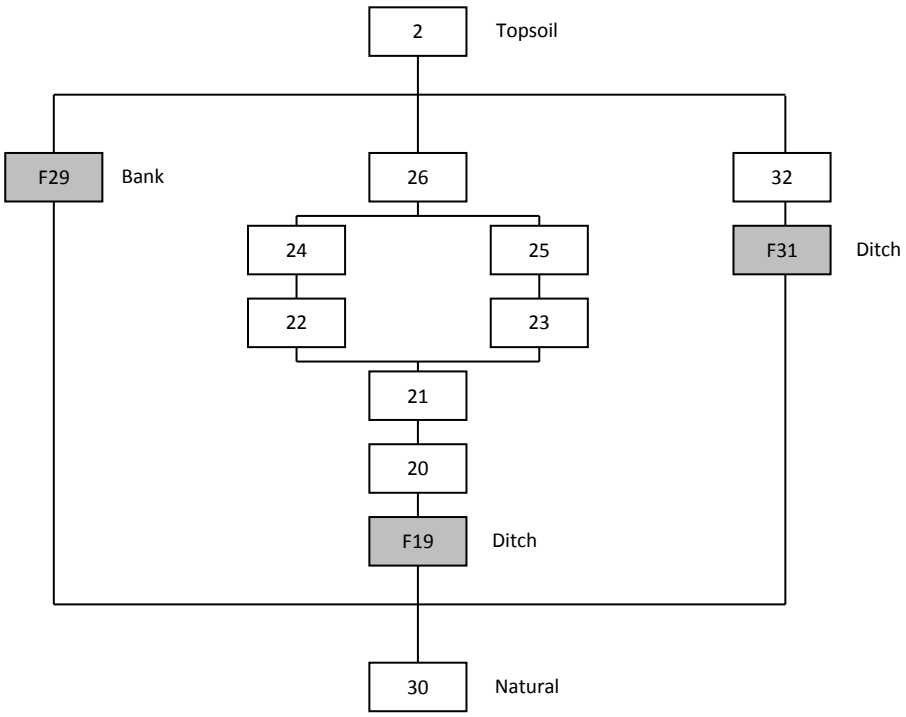
[w-wet/damp ground; x-wide niche. (+): trace; +: rare; ++: occasional; +++: common; ++++: abundant
Waterlogged remains are scored from 1-5 where 1: 1-2; 2: 3-10; 3: 11-40; 4: 41-200; 5: >200
(✓) may be unsuitable for dating due to size or species]

Appendix 2: Stratigraphic matrices

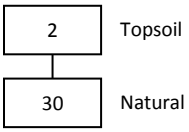
Trench 1



Trench 2



Test pit



Appendix 3: Summary of radiocarbon dating

Context	Sample	Laboratory code	Material	$\delta^{13}C$ ‰	Radiocarbon Age BP	Calibrated date 95.4% probability
12	4	SUERC-59132 GU36981	Birch charcoal	-25.5	3754 ± 27	2281 (8.5%) 2249 cal BC 2231 (71.6%) 2121 cal BC 2094 (15.3%) 2042 cal BC
16	14	SUERC-64626 GU39494	Charred hazel nutshell	-26.2	3711 ± 29	2200 (95.4%) 2027 cal BC
22	8	SUERC-64627 GU39495	Birch charcoal	-26.9	1706 ± 29	252 (95.4%) 400 cal AD
33	17	SUERC-64628 GU39496	cf. Alder charcoal	-26.4	2561 ± 28	805 (72.2%) 748 cal BC 685 (6.6%) 667 cal BC 641 (13.1%) 587 cal BC 581 (3.6%) 556 cal BC

[The calibrated age ranges are determined using OxCal4.2.4 (Bronk Ramsey 2009); IntCal13 curve (Reimer *et al.* 2013)]

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Figure 1: Site location

site location

0 1km
scale 1:25 000 for A4 plot

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trench

0 200m
scale 1:4000 for A3 plot

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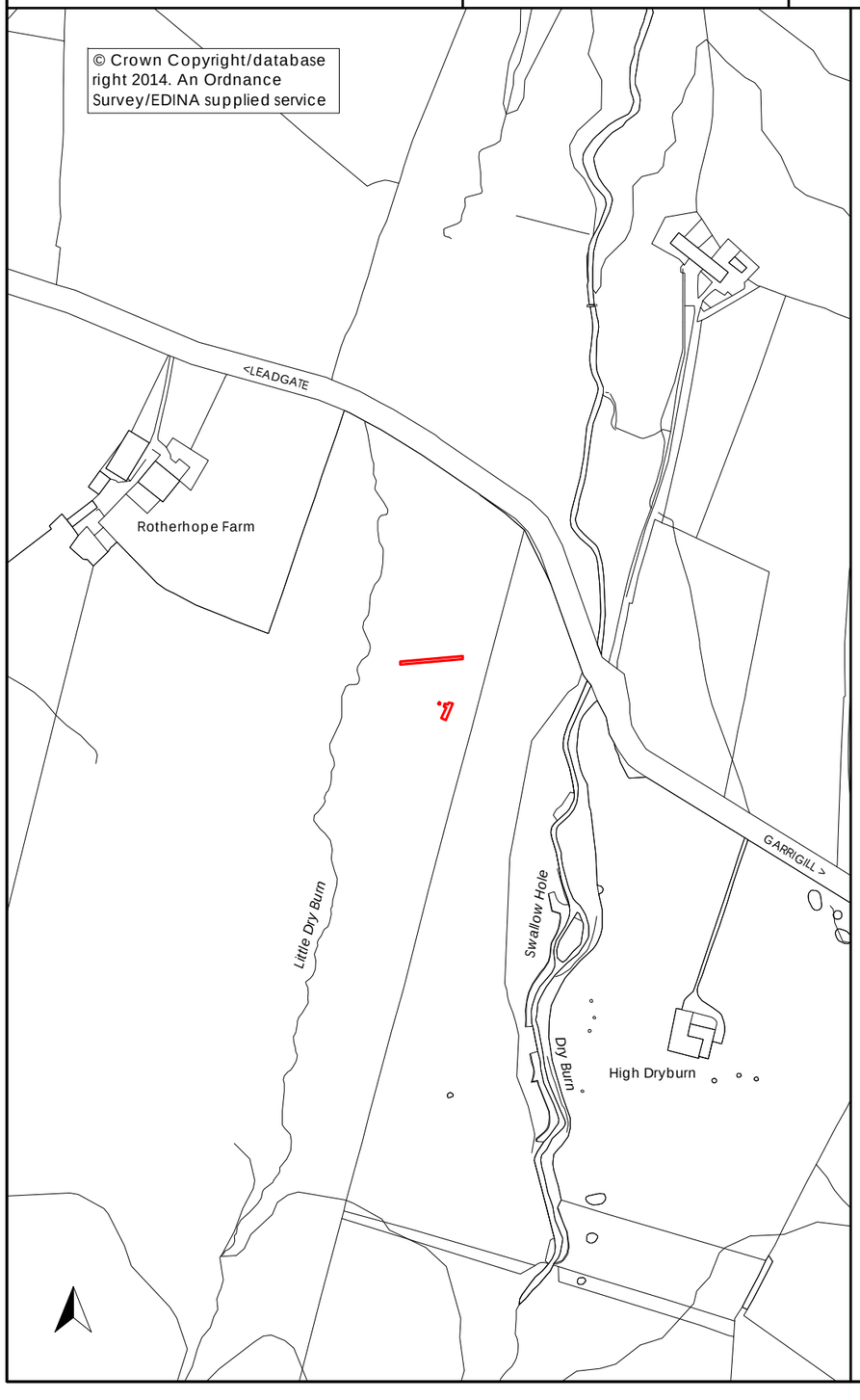
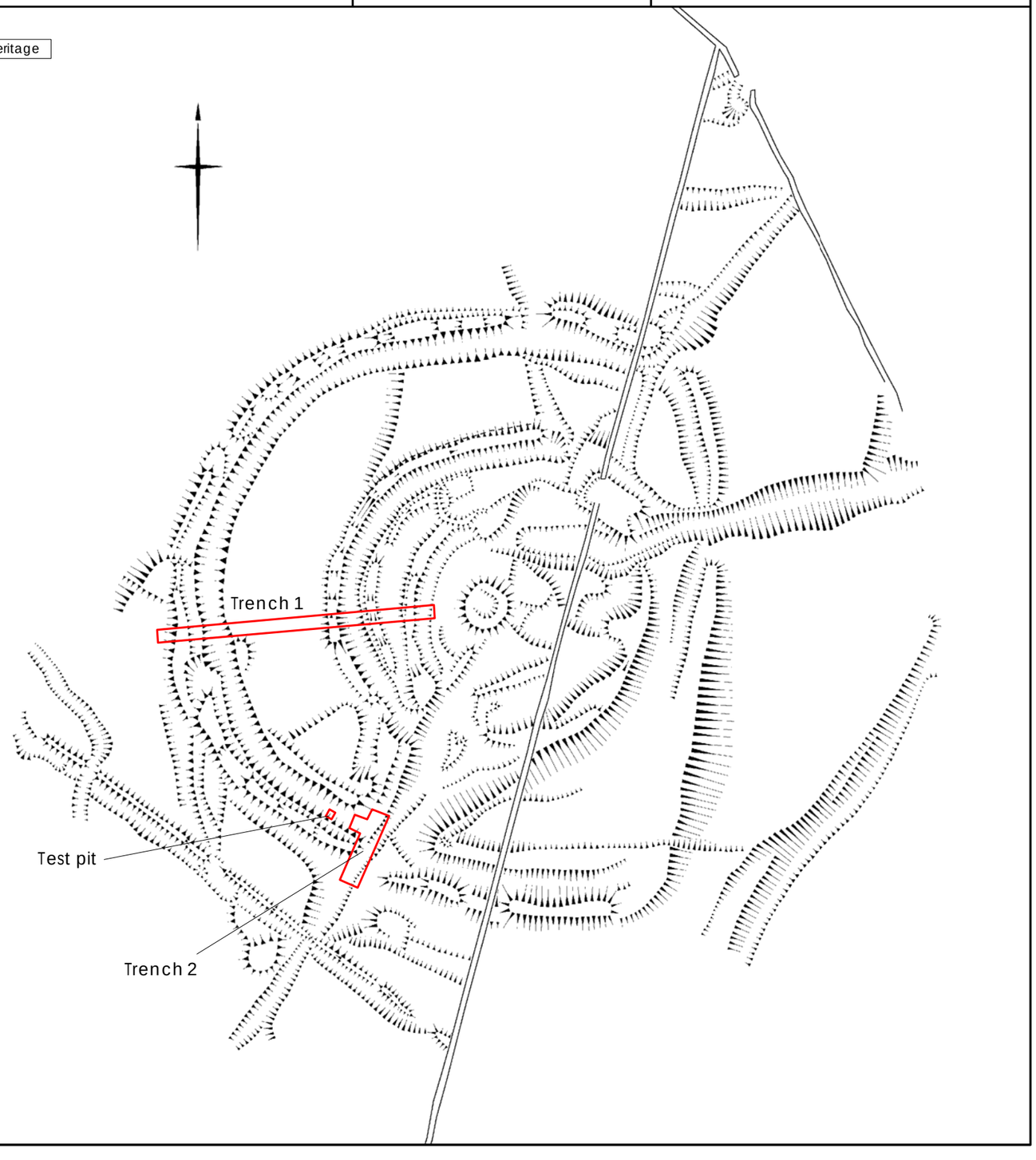
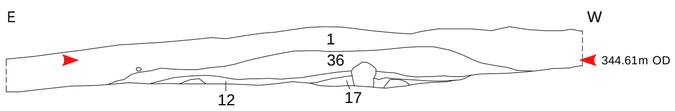
Figure 2: Trench locations



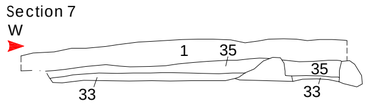


Trench 1

Section 10



Section 7



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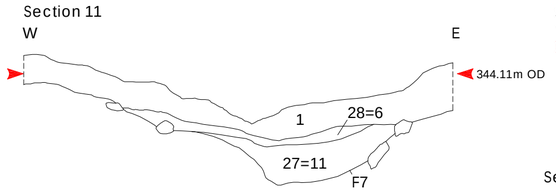
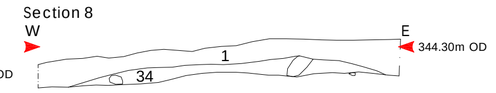
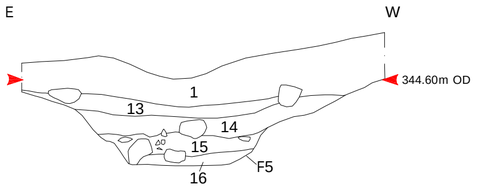


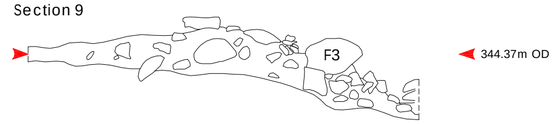
Section 8



Section 2

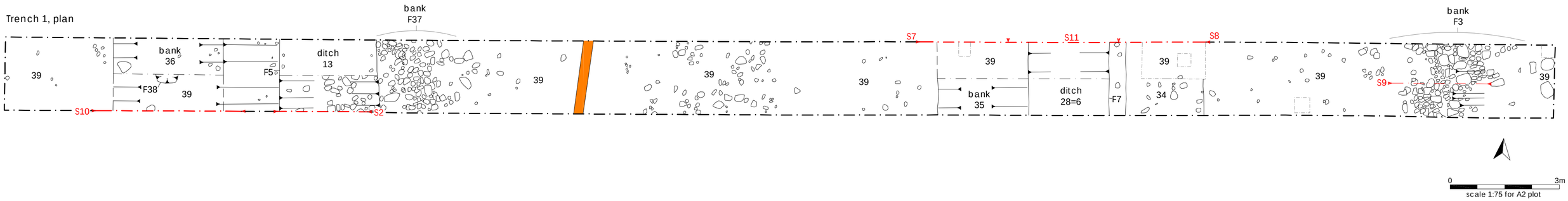


Section 9



0 1.5m
scale 1:30 for A2 plot

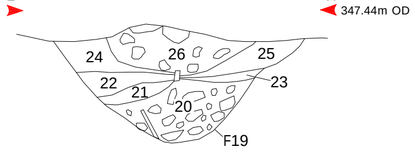
Trench 1, plan



0 3m
scale 1:75 for A2 plot

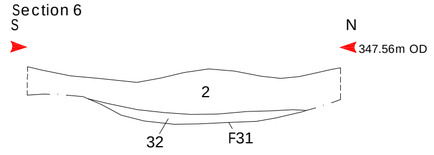
Trench 2

Section 4



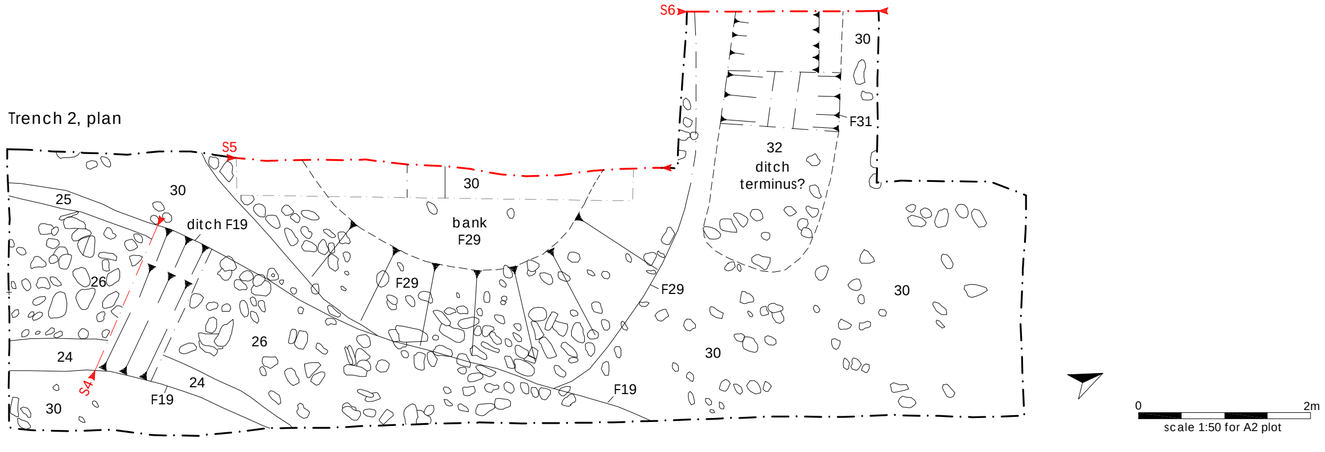
Section 5

Section 6



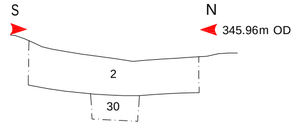
0 1.5m
scale 1:30 for A2 plot

Trench 2, plan

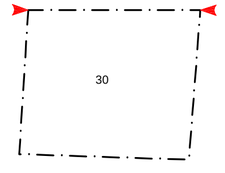


0 2m
scale 1:50 for A2 plot

Section 12



Test pit, plan



0 1.5m
scale 1:30 for A2 plot

extent of excavation

section 2

field drain

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Figure 3: Trench plans and sections

Figure 4: Trench 1, looking north

Figure 5: Outer ditch F5, looking south

Figure 6: Section through outer bank [36], looking south-east

Figure 7: Section through internal bank [F37] of outer ditch, looking north-west

Figure 8: Section through inner ditch F7, looking south

Figure 9: Section through outer bank of inner ditch [35], looking east

Figure 10: Section through inner bank [34] of inner ditch, looking north-east

Figure 11: Section through internal bank F3, looking north

Figure 12: Trench 2, looking south

Figure 13: Section through Channel [F19], looking south