Land off Uplowman Road
Tiverton
Devon

Post-Excavation Assessment and Updated Project Design

for

Barratt David Wilson Homes

CA Project: 889017

CA Report: 889017_1

August 2019

Andover Cirencester Exeter Milton Keynes Suffolk

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Tiverton
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SUMMARY

Site Name:	Land off Uplowman Road, Tiverton
Location:	Devon
NGR:	298825 113928
Type:	Excavation
Date:	January-February 2018
Planning Reference:	13/01616/MOUT
Location of archive:	To be offered to the Royal Albert Memorial Museum (Exeter); Archaeological Data Service) (ADS)
Museum Reference Number:	RAMM:18/03
Site Code:	URT 18

A programme of archaeological investigation was undertaken by Cotswold Archaeology in January and February 2018 at the request of Barratt David Wilson Homes on land off Uplowman Road, Tiverton, Devon. An area of approximately 530 square metres was excavated within the development site.

The investigation revealed a sub-square ditched enclosure with external dimensions measuring 11.25m by 10.5m and a possible narrow entrance to the east. The ditch contained multiple backfilling deposits but only yielded a small pottery assemblage, which indicated a broad Roman date of deposition. Optical stimulated luminescence (OSL) dating of one deposit indicated a broad late prehistoric to early Roman date, whilst another deposit produced an OSL date indicating secondary re-use in the early medieval period. Centrally placed within the enclosed area was a possible grave pit, aligned with the eastern entrance, though no definitive evidence of a burial was present and no dateable finds were recovered. A row of undated postholes east of the enclosure also appeared to be associated features. An apparently curvilinear ditch and an irregular pit located to the north of the enclosure did not appear to have been associated with it and were undated. Two linear ditches were of post-medieval date; one associated with land division and the other a field drain.

This document presents a quantification and assessment of the evidence recovered from the excavation. It considers the evidence collectively in its local, regional and national context, and presents an updated project design for a programme of post-excavation analysis to bring the results to appropriate publication.

1 INTRODUCTION

1.1 In January and February 2018, Cotswold Archaeology (CA) carried out an archaeological excavation on land off Uplowman Road, Tiverton, Devon (centred at NGR: 298825 113928; Fig. 1). The excavation was undertaken on behalf Barratt David Wilson Homes.

1.2 Mid Devon District Council has granted outline planning permission (ref: 13/01616/MOUT) for the development of up to 330 dwellings at the site, together with public open space, associated infrastructure and other works, including vehicular access, pedestrian/cycle links and highway improvements. Condition 18 of this planning permission states:

No development of any phase shall take place until the applicant has secured the implementation of a programme of archaeological work in accordance with a written scheme of investigation which has been submitted by the applicant and approved by the Planning Authority.

The development shall be carried out at all times in strict accordance with the approved scheme, or such other details as may be subsequently agreed in writing by the District Planning Authority.

1.3 The scope of this programme of archaeological excavation was defined subsequently in discussions with Stephen Reed, Senior Historic Environment Officer, Devon County Council Historic Environment Team (DCCHET), the archaeological advisor to Mid Devon District Council.

1.4 The archaeological excavation was carried out in accordance with a Written Scheme of Investigation (WSI) produced by CA (2018) and approved by Stephen Reed. The excavation was also carried out in line with *Standard and guidance for archaeological excavation* (CIfA 2014), *Management of Research Projects in the Historic Environment (MoRPHE) PPN 3: Archaeological Excavation* (Historic England 2015) and *Management of Research Projects in the Historic Environment (MoRPHE): Project Manager’s Guide* (Historic England 2015).

1.5 The excavation fieldwork was monitored by Stephen Reed, including site visits on 17, 23 and 25 January 2018.

Location, topography and geology

1.6 The proposed development site as a whole encloses an area of approximately 13.8ha. It comprises two parcels of land to the east of Tiverton, lying between the A361 and Blundell's Road/Post Hill. The two land parcels are divided by Uplowman Road, though only the area between the A361 and Uplowman Road is discussed in this report (Fig. 2). The land slopes downwards from south to north; from approximately 94m above Ordnance datum (aOD) on the north side of Uplowman Road to *c*. 86m aOD in the area of excavation.

1.7 The field within which the current archaeological excavation was undertaken lies within the north-eastern limit of the proposed development site. This field covers approximately 2ha and was farmland at the time of the excavation. Uplowman Road runs along its southern and eastern boundaries; the A361 runs along its northern boundary; further farmland lies to the west.

1.8 The underlying bedrock geology of the excavation area is mapped as Tidcombe Sand Member sandstone of the Permian period. This is overlain by alluvial clays, silts and sands (BGS 2019).

Archaeological background

1.9 The proposed development site and its immediate environs have been the subject of an archaeology and cultural heritage assessment, which included a targeted geophysical survey and trial trench evaluation (AC Archaeology 2009), a further trial trench evaluation (CA 2012b) and a desk-based heritage assessment (CA 2014). The following text presents a brief summary archaeological background derived from these sources.

1.10 Two Scheduled Monuments lie in the immediate vicinity of the excavation site (Fig. 1): a Neolithic long barrow (*c*. 350m south-west of the excavation site; Historic England List Entry Number: 1019058) and a Bronze Age bowl barrow (*c*. 180m north-west of the excavation site; Historic England List Entry Number: 1017132).

1.11 A small, sub-square enclosure cropmark is visible within the excavation site on aerial photographs; the geophysical survey recorded a sub-circular enclosure anomaly in this location (Fig. 2). This potential enclosure was tested by the initial phase of evaluation trenching (Tr5, AC Archaeology 2009), which recorded no corresponding below-ground archaeological features. Three undated shallow ditches and a possible pit were recorded, none of which were in the location of the enclosure.

1.12 Several linear geophysical anomalies were recorded within the vicinity of the site boundary. These were tested by the second phase of evaluation trenching (Cotswold Archaeology 2012) and were shown to correspond to undated ditches (Fig. 2; ditches 26003, 27003, 29004, 29006 and 29009). These are considered to represent former historic field boundaries.

2 AIMS AND OBJECTIVES

2.1 The aims of the excavation were to establish the character, quality, date, significance and extent of any archaeological remains or deposits surviving within the site. This information will assist the Local Planning Authority in making an informed judgement on the likely impact upon the archaeological resource by the proposed development.

2.2 As defined in the WSI (CA 2018), the objectives of the archaeological excavation were to:

- identify, investigate and record any significant buried archaeological deposits/features, prior to their destruction by the proposed development;
- recover and analyse any artefactual evidence to date any archaeological remains that may be identified;
- sample and analyse environmental remains to create a better understanding of past land use and economy; and
- archive, report on and publish the archaeological results at a level appropriate to their significance.

3 METHODOLOGY

3.1 The fieldwork followed the methodology set out in the WSI (CA 2018). A single area measuring approximately 23m x 23m in plan was excavated. This area was targeted on the possible enclosure visible on historic aerial photographs and detected by the geophysical survey (AC Archaeology 2009; see *Archaeological background*, above).

3.2 As specified in the WSI (CA 2018), the excavation area was to have measured 20m x 15m in plan. However, during excavation it was found that this area only partially exposed the enclosure; it was therefore extended in order to fully expose the enclosure and some postholes to the east (see below). This was agreed with Stephen Reed, and was in accordance with para. 4.2 of the WSI (CA 2018): "The extent of the excavation area will be kept under review during the course of the stripping and the boundaries of the area may be adjusted in accordance with what is found."

3.3 Overburden layers (topsoil, subsoil and colluvium) were stripped from the excavation area by a mechanical excavator equipped with a toothless grading bucket. All overburden stripping was carried out under archaeological supervision. Stripping was undertaken to the top of the natural substrate, which was the level at which significant archaeological features were first exposed.

3.4 All archaeological features were investigated, planned and recorded in accordance with the WSI (CA 2018) and *CA Technical Manual 1: Fieldwork Recording Manual* (2017). Discrete features were 50% excavated and although the WSI stipulated that linear features should be a maximum of 10% sample excavated, because of the complexity of backfilling of the main enclosure ditch and the lack of artefactual evidence, this feature was approximately 30% excavated.

3.5 Deposits were assessed for their environmental potential and samples were taken in accordance with *CA Technical Manual 2: The Taking and Processing of Environmental and Other Samples from Archaeological Sites* (2012a). A series of bulk samples were taken from the fills of the enclosure ditch and the fill of internal feature 624. Additionally, monolith samples were taken from two of the enclosure ditch interventions and Optically Stimulated Luminescence (OSL) samples were taken from the enclosure ditch fills (see Appendices 5 and 6, below)

3.6 All artefacts recovered during the excavation were retained and processed in accordance with *CA Technical Manual 3: Treatment of Finds Immediately After Excavation* (CA 1995).

4 RESULTS

Fieldwork summary

4.1 This section provides an overview of the excavation results; detailed summaries of the recorded contexts, finds, environmental samples (biological evidence) and scientific dating are to be found in Appendices 1 - 6.

4.2 Stripping exposed a sub-square, ditched enclosure (A) with a single entrance in its north-eastern side and a pit (624), located in the centre and interpreted as a possible grave. To the north-east of the enclosure there was row of postholes on an approximately north-west/south-east alignment. Towards the north-west of the site a curvilinear ditch (627) extended south-westwards for almost 5m before terminating. West of this was an irregular pit (604) and cutting across the north-west corner of the excavation area was a narrow north-west/south-east aligned ditch.

4.3 Dating evidence recovered during the excavation and stratigraphic analysis of the features has indicated three distinguishable periods of activity in addition to the natural stratigraphy, whilst some features could not be definitively assigned a phase based on stratigraphy or spot dating evidence and remain unphased:

- Period 0: Natural geology
- Period 1: Romano-British
- Period 2: Early medieval
- Period 3: Post-medieval
- Undated

Natural Stratigraphy

4.4 Natural substrate 603 (Period 0) comprised compact reddish sand with frequent pebble inclusions and was exposed at a depth of 0.8m–0.9m below the present ground level. It was overlain in the northern part of the excavation area by silty sand colluvial material 602, which had derived from upslope to the south and was 0.2m in thickness. The colluvium and the natural substrate (where the colluvium was not present) were covered by silty clay subsoil layer 601, which was 0.3m in thickness. The excavation area was sealed by 0.38m of silty clay topsoil 600.

4.5 Most of the archaeological features exposed within the excavation area (with two exceptions) were cut into the natural substrate and sealed by the colluvial layer (where present) or the subsoil (where the colluvial layer was absent).

Period 1: Romano-British

Enclosure A

4.6 Enclosure A was exposed towards the centre of the excavation area (Figs 3 and 4). It was sub-square in plan and was defined by a substantial ditch, the outer edges of which, measured approximately 11.25m north-east/south-west by 10.5m north-west/south-east in plan, whilst the interior edge measured approximately 6.6m x 6.1m. The ditch enclosed an area of approximately 40.3m².

4.7 The ditch was not continuous as there was a 0.75m wide gap, approximately mid way along the north-eastern edge of the feature, flanked by rounded ditch terminals. This may have represented a point of access into the enclosed area.

4.8 Six interventions were excavated across the enclosure ditch (Fig. 3; slots A–F) in order to investigate the terminals and corners of the ditch, as well as to provide representative cross-sections. Two further slots were subsequently excavated for the recovery of artefactual material, though no finds were recovered from these interventions. Approximately 30% of the ditch was excavated in total.

4.9 The ditch was between 2.1m and 2.4m wide and between 1.1m and 1.25m deep. The profile was broadly consistent in all interventions; the upper edges of the ditch sloping at approximately 45 degrees, breaking to a much steeper slope approximately mid way down the profile. The base of the ditch was broadly flat and there was no evidence for postholes or other cut features within the base in any of the interventions investigated.

4.10 The infilling sequences within the ditch were broadly consistent along its length, with the exceptions of slots B and C along the south-eastern edge (see below). The ditch generally contained one or two primary fills which appear to have formed through erosion/slumping of the sides (e.g. fills 660 and 661 in slot D (Fig. 5, Sec. CC), fill 618 in slot E (Fig. 6, Sec. DD), fills 646 and 647 in slot B (Fig. 7, Sec. EE) and fill 678 in slot C (Fig. 7, Sec. FF)). A succession of sedimentary fills overlay the primary deposits. These sedimentary fills were then sealed throughout the ditch by a greenish grey silty clay layer, which was present in all interventions (fill 669 in slot A (Fig. 5, Sec. AA), fill 633 in slot F (Fig. 5, Sec. BB), fill 664 in slot D (Fig. 5, Sec. CC), fill 621 in slot E (Fig. 6, Sec. DD), fill 651 in Slot B (Fig. 7, Sec. EE) and fill 681 in Slot C (Fig. 7, Sec. FF)). This layer was originally thought to represent a possible stabilisation horizon, but geoarchaeological analysis of the deposit in slots E and C (see Appendix 5) suggest further slumping of material from the feature edges. It was overlain by further sedimentary fills.

4.11 There was no clear evidence within the ditch fills for slumping of material from former internal or external banks.

4.12 A second possible stabilisation horizon was present in the southern part of the enclosure ditch: fill 653 in Slot B (Fig. 7, Sec. EE) and fill 682 in Slot C (Fig. 7, Sec. FF). This layer comprised greyish brown silty sand, but again geoarchaeological analysis demonstrated that it represented further infilling rather than stabilisation and soil formation.

4.13 The various fills of the ditch yielded very little artefactual material; a single sherd of likely late prehistoric/early Roman pottery was recovered from fill 652 in Slot B (Fig. 7, Sec. EE), two small sherds of broadly dated Romano-British pottery were recovered from fill 667 in Slot A (Fig. 5, Sec. AA) and a single, small Romano-British sherd was recovered from fill 623 in Slot E (Fig. 6, Sec. DD). Residual worked flints were also recovered from fill 668 in Slot A and fill 621 in Slot E.

4.14 In order to gain further dating evidence, Optically Stimulated Luminescence (OSL) samples were taken from both possible stabilisation horizons (see Appendix 6, below), though as outlined above, these were found not to be such deposits. The sample from the earlier fill 621 (Fig. 6, OSL 1; in Slot E) gave a date range of 240 BC to AD 150, whilst the sample from later fill 653 (Fig. 7, OSL 2; in Slot B) gave a date range of AD 690 to AD 970. The earlier deposit fits broadly within the date range suggested by the limited artefactual evidence from the ditch fills but the later deposit is much later than the artefactual remains and possibly relates to a post-Roman recut of the feature (see below).

Pit 624

4.15 Pit 624 (Fig. 8, Secs. GG and HH) lay broadly within the centre of Enclosure A and was the only internal feature. It was aligned north-east/south-west (i.e. on the same alignment as the enclosure ditch) and it lay in line with the gap between the two ditch termini on the north-eastern side of the enclosure.

4.16 The pit was 2.38m long, 0.78m wide and 0.32m deep. It had steep sides and a flat base. It contained a single grey-brown sandy silt fill, with frequent stone inclusions (625). It had initially been thought in the field that the pit may have been a grave and it was carefully excavated in quadrants. However, the fill was sterile, with no skeletal remains, artefacts nor charcoal present; the acidic nature of the soil precluding the preservation of bone and possibly other materials. The feature has been dated to this period because of its apparent association with Enclosure A.

Postholes

4.17 Nine postholes (611, 636 (Fig. 9, Sec. II), 638, 640, 642, 644 (Fig. 10, Sec. KK), 658, 674 and 676) lay to the east/north-east of Enclosure A. With the exception of posthole 611, these formed a broad north-west/south-east alignment running parallel to the enclosure's north-eastern side. The postholes were all discrete features with the exception of 640, which cut 642 (Fig. 9, Sec. JJ), whilst 674 and 676 were almost touching and were probably associated with one another (Fig. 10, Sec. LL).

4.18 All of the postholes were shallow, measuring 0.1m–0.25m in depth and 0.3m–0.5m in diameter. No finds were recovered from any of these features, but they have been assigned to this period because of their apparent association with Enclosure A.

Period 2: Early medieval

4.19 No clear evidence of a distinct early medieval period of occupation was apparent but OSL dating of fill 653 in slot B of the enclosure ditch indicated deposition between the 7th and 10th centuries AD. It is possible that this and the overlying deposit 654 represent the infilling of a shallow recut of the ditch in the early medieval period.

Period 3: Post-medieval

Ditch 608

4.20 Ditch 608 (Fig. 11, Sec. MM) was cut into colluvium layer 602 and extended across the western edge of the excavation area on a north-west/south-east alignment. It was 0.51m–0.7m in width and 0.17m–0.35m in depth, being narrower and shallower in the south-east due to truncation. It contained up to two sedimentary fills, both of which were undated, though it has been assigned to this period because it post-dated the colluvium.

Drain 627

4.21 French drain 627 lay in the north-western part of the site, where it truncated undated ditch 613/615 (Fig. 12, Sec. OO and see below). The relationship between this drain and colluvial layer 602 was not observed during the overburden strip, but the drain is likely to have been of post-medieval date.

Undated

Ditch 613/615

4.22 Ditch 613/615 (Fig. 12, Secs. OO and PP) extended from the north-western edge of the excavation area on a broad, but slightly curving, north/south alignment. Approximately 5m of the ditch was present within the excavation area and it terminated approximately 2.5m north of Enclosure A. Ditch 613/615 was 1.15m wide and 0.45m deep and contained up to three sedimentary fills, none of which produced dateable artefactual evidence. It had been truncated by post-medieval/modern drain 627.

Pit 604

4.23 Pit 604 (Fig. 11, Sec. NN) lay approximately mid way between ditches 613/615 and 608, towards the north-western corner of the excavation area. This pit was approximately sub-oval in plan. It was 2.5m long, 1.36m wide and 0.12m–0.36m in depth, being deepest at its northern end. It contained a single undated sedimentary fill (605).

5 FACTUAL DATA AND STATEMENTS OF POTENTIAL

Stratigraphic Record: factual data

5.1 Following the completion of the fieldwork an ordered, indexed, and internally consistent site archive was compiled in accordance with specifications presented in the Management of Research Projects in the Historic Environment (MORPHE): Project Manager's Guide (Historic England 2015a). A database of all contextual and artefactual evidence was also compiled and cross-referenced to spot-dating and OSL dating. The fieldwork comprises the following records:

Context sheets	85
Sections (1:10, 1:20)	27
Sample sheets	7
Digital photographs	358

5.2 The survival and intelligibility of the site stratigraphy was good with archaeological remains having survived as negative features. Despite a relative paucity of stratigraphic relationships, most features have been assigned a preliminary period based on dated artefactual material and/or spatial association.

Stratigraphic record: statement of potential

5.3 A secure stratigraphic sequence is essential to elucidating the form, purpose, date, organisation and development of the various phases of activity represented. This can be achieved through detailed analysis of the sequence and further integration of the artefactual dating evidence. The refined sequence will then serve as the spatial and temporal framework within which other artefactual and biological evidence can be understood.

5.4 While the stratigraphic record forms a complete record of the archaeological features uncovered, the relative lack of inter-relationships between these features, and the limited amount of dating evidence available from other datasets, limits the potential for fully elucidating the function and development of the site.

Artefactual record: factual data

5.5 All finds collected during the excavation have been cleaned, marked, quantified and catalogued by context.

Type	Category	Count	Weight (g)
Pottery	Roman	4	26
Flint	Worked/burnt	3	32

5.6 Very little artefactual evidence was recovered from the site, indeed small quantities of struck flint and pottery were the only finds recovered.

Worked flint

5.7 Only three pieces of worked flint were recovered during the excavation; two from fills of the Enclosure A ditch and one from the topsoil. The assemblage comprises a broken flake and a piece of burnt shatter from the enclosure ditch and a core rejuvenation flake from topsoil. The latter is likely to be of Mesolithic or Early Neolithic lithic date, whilst the other two items are not chronologically diagnostic.

Pottery

5.8 Just four sherds of pottery were recovered during the course of the excavation; all from fills of the Enclosure A ditch. One sherd has been dated as late prehistoric/early Roman, whilst the other three are all of broad, Romano-British date.

Artefactual record: statements of potential

Worked flint

5.9 The lithic assemblage is very small and redeposited. It provides evidence of activity during the prehistoric period and specifically of flint knapping during the Mesolithic or Early Neolithic period. Any publication on the site should include a short paragraph characterising the lithics. No further recording, research or illustrations are necessary.

Pottery

5.10 The pottery group is small and provides only broad dating evidence. The rim sherd represents the only identifiable vessel form from the site and should be drawn for publication. A short accompanying summary should also be included, which can be adapted from the specialist contribution to this report.

Biological record: factual data

5.11 No ecofacts were hand-recovered from the excavation. A total of seven bulk samples were taken for the recovery of environmental remains, along with three column samples for geoarchaeological and pollen analysis and two samples for OSL dating.

Type	Category	Count
Samples	Environmental	7
	Monolith	3
	OSL dating	2

Plant macrofossils and charcoal

5.12 Two samples were taken from the fill of pit 624 and yielded small quantities of botanical remains, including Ericaceae type stem fragments, parenchyma (soft, cellular tissue) fragments and a few charcoal pieces greater than 2mm. These assemblages may be reflective of dispersed material; the Ericaceae type stem fragments are likely to be from the local vegetation and would have been used for fuel where the temperature or need for prolonged heat wasn't critical, such as in domestic hearths. There was no indication from the samples that this feature may have been a grave; no artefacts likely to have been associated with a burial were recovered from either of the environmental samples. Five samples were taken from fills of the enclosure ditch, which yielded low numbers of charred plant remains including hulled wheat, emmer or spelt (*Triticum dicoccum/spelta*), glume base fragments, tuber fragments, Ericaceae type stem fragments and a few charcoal fragments greater than 2mm. Again these assemblages may be representative of dispersed material, whilst a glume base fragment indicates a Roman or earlier date. These assemblages provide no clear indication of the likely function of the square enclosure nor is there any indication from the environmental remains of any settlement activity taking place in the immediate vicinity.

Geoarchaeology and pollen

5.13 Monolith samples were taken from two exposed sections excavated through the enclosure ditch. The predominant grain size is a silty-clay, although there is a higher proportion of sand size fraction associated with the basal contexts probably associated with primary fill. Within the middle of both monolith sequences were contexts dominated by the inclusion of large angular sandstone, probably indicative of material excavated from the ditch and placed on its margin to form a bank. Subsequent deposits appear to indicate further sedimentation within the enclosure ditch, though there is no buried soil visible in either monolith sequence to suggest a period of site stability between different depositional phases.

5.14 Pollen concentrations were very low in all six samples taken from the monoliths and preservation was also fairly poor with the pollen assemblage largely dominated by types more resistant to corrosion. Of the pollen identified, the taxa present were largely restricted to grasses with some indicators of local disturbance also present in most samples, along with some occurrences of cereal-type pollen within the uppermost fills. Pollen of trees and shrubs was almost completely absent suggesting potentially a largely open environment.

OSL dating

5.15 Samples of two enclosure ditch fills, originally thought to represent stabilisation deposits were submitted for OSL dating. The earlier deposit yielded a date of 280 BC to AD 150, indicating deposition in the later prehistoric/early Roman period, whereas the later deposit yielded a date of AD 690 to 970, indicating an early medieval date of deposition. The disparate dates suggest at least two phases of backfilling of the ditch and possibly a re-cutting episode.

Biological record: statements of potential

Plant macrofossils and charcoal

5.16 Further analysis of the charred plant assemblages has no potential to provide more information on the nature of the site, the range of crops and local crop processing activities and the surrounding environment due to the paucity of remains recovered. There is little potential for charcoal analysis to provide detailed information on the species composition and the management and exploitation of the local woodland resource due to the sparse quantities recovered. No further work is recommended on the charred plant material or the charcoal and no material was recovered from pit 624 or the enclosure ditch that was suitable for radiocarbon dating.

Geoarchaeology and pollen

5.17 There is no potential for further geoarchaeological analysis. Pollen preservation and counts were low and there is little potential for obtaining a palaeoenvironmental record using pollen analysis. Consequently there is no recommendation for any further pollen analysis from the two sampled sequences from the enclosure ditch.

OSL dating

5.18 OSL dating has been carried out on two samples from fills of the Enclosure A ditch, which have indicated infilling at two disparate dates and a possible re-cutting of the feature. The dating has been completed and no further work is required on these sediments.

6 SUMMARY STATEMENT OF POTENTIAL

6.1 The archaeological investigations have revealed a very distinct, ditched enclosure, the limited artefactual evidence and a single OSL date indicating a broad Roman date. However, a second OSL date has indicated secondary activity in the post-Roman period. An undated feature, centrally-placed within the enclosed area has been interpreted as a possible grave and whilst there was no artefactual or ecofactual evidence to support this notion, it is possible that there was once a burial here, though any evidence of its remains were probably removed by acid soil conditions. An undated row of postholes to the east of the enclosure and aligned approximately parallel with it, have also been interpreted as associated, contemporary features, possibly forming a fence line outside of the enclosure's eastern entrance. A ditch and field drain towards the north-west of the excavation were almost certainly post-medieval, though neither contained any dateable artefactual material. A possible curvilinear ditch and an irregular pit in the same area were also undated but appeared to be earlier features; the backfilled ditch being partly truncated by the field drain.

6.2 The enclosure ditch appears to have been a single-phase excavation and the dimensions were broadly consistent along the length, width and depth of the feature. If there had been any later modification then it would be anticipated that there would be a variation in dimensions, such as the depth, the profile and also the fills of the opposing sections. However, evidence of possible re-cutting of the partially backfilled ditch at a much later date was evident in some exposed sections.

6.3 In all the profiles of the enclosure ditch the base was flat. This could suggest that the ditch was a large post trench. However, there was no evidence for postholes either along the top of the ditch, within the fills of the sections or in the base of the recorded interventions. The ditch would have produced a substantial amount of spoil and the upcast would have created a large visible bank or mound.

6.4 No finds were found above the first apparent stabilization layer observed in all the sections. However, the geoarchaeological assessment indicated that this was not in fact a stabilization layer but further infilling of the ditch.

6.5 Although no dating was recovered from the postholes, they appear to have been contemporary with the enclosure. Both were sealed by the colluvium and the posthole alignment was parallel with the north-east edge of the enclosure ditch with the exception of one feature, which may not have been contemporary. The alignment did not extend much beyond the north-west and south-east limits of the enclosure, but its function was unclear; it could have been a line of individual posts in front of the monument, a fence line or possibly even have supported a screen across the entrance. The latter could suggest there was no direct access in to the enclosure unless it was approached from the north-west or south-east, but there were no apparent means of access here. The intercutting postholes suggest that the fence line may have been repaired and maintained.

6.6 Although there was no direct evidence for an external bank or an internal mound, it is possible that the infilling sequence in the south-west corner of the enclosure (slot xx??) may be evidence for a bank slumping. However, this is not replicated in any of the other sections and may simply be reflective of sedimentation around a sharp return. The lack of a slump either from an internal mound or external bank suggests the upcast was positioned well away from the ditch edge, though the geoarchaeological analysis did suggest the possibility of some slumping of upcast material. There are problems with both internal and external mounding hypotheses: Logic would suggest an external bank as there is an entrance, though the gap is only 0.7m wide. It may originally have been wider but repeated cleaning could have narrowed the gap. Another difficulty relates to the posthole alignment: The gap between the postholes and ditch edge was approximately 4m. If the access was a staggered entrance then it is questionable whether there would be enough space between the bank, given the probable buffer zone, and the fence line to provide a viable walkway.

6.7 If there was a central mound then there appears to be no purpose in having an entrance. Potentially the explanation may be that the enclosure was aligned to a topographical land mark or a now non-extant monument. The entrance may have been a fake entrance solely for ritual purposes. Out of all the scenarios the external bank with a staggered entrance seems the more likely.

6.8 The possible grave was an isolated feature; there were no other potential interments or cremation burials evident within the excavation area. Given the paucity of material culture there was little to suggest settlement in close proximity. The monument was low-lying within a valley and some thought appears to have been given to its location. As it was not close to a settlement the location may have been chosen with regard to the two earlier funerary monuments in relatively close proximity; the Neolithic long barrow and Bronze Age barrow. Potentially its purpose could have been as visible statement of continuity of practice and land ownership.

6.9 The curvilinear ditch and adjacent pit are undated and appear to have had no direct relationship to the potential funerary monument. They were both sealed by the colluvium and could be reflective of earlier activity within the excavation area. The site would need to be extended further to the north to fully understand the form and function of the curvilinear feature.

6.10 The linear ditch to the west of the enclosure seems to be consistent with a later field system. The geophysical survey and aerial photograph show a probable ditch north-east to south-west aligned just outside the excavation area. This ditch was excavated during the 2012 evaluation. It was interpreted as a historic field boundary as it broadly respected the existing field boundary although no dating was recovered. The north-west to south-east aligned ditch found in the excavation area would form a right angle return to the ditch located outside of the area.

6.11 Although part of a later field system this ditch broadly respects the alignment of the enclosure. The crop mark and geophysical evidence appear to indicate that the later field system was laid out positioning the enclosure in the extreme south-west corner of the field, suggesting that the enclosure was still visible as an earthwork at this time.

6.12 The aims and objectives, as outlined in Section 2 above have been met to some extent by the project. The character, quality, date, significance and extent of archaeological remains within the excavation area has been ascertained and interpreted, though some further work is clearly required (see below). The archaeological remains within the site have been fully investigated and recorded and all recovered artefactual material has been identified and assessed. Samples were taken for the recovery of biological remains, sedimentary assessment and dating and all of these aspects of the project have made small contributions to the understanding of the site detailed in this report.

7 STORAGE AND CURATION

7.1 The archive is currently held at CA offices, Exeter, whilst post-excavation work proceeds. Upon completion of the project and with the agreement of the legal landowners, the site archive and artefactual collection will be offered for deposition with the Royal Albert Memorial Museum, Exeter , and the digital archive will be placed on the ADS..

8 UPDATED AIMS AND OBJECTIVES

8.1 To fulfil the potential of the site data, the following updated objectives have been set out to provide a framework for the proposed further analysis:

Objective 1: establish a more accurate function and dating for the possible grave located within the ditched enclosure

8.2 The centrally-placed pit within the ditched enclosure has been interpreted as a possible grave, though with no supporting physical evidence. The feature also remains undated; it has tentatively been dated as Roman but similar features elsewhere have been dated as early medieval (see below). It is hoped that comparison with similar features may permit a better understanding of the nature and date of the feature and possibly also the enclosure complex. Unfortunately none of the material recovered from environmental samples was suitable for radiocarbon dating.

Objective 2: integrate the site within its wider landscape, in particular comparing and contrasting with similar monuments within the Devon region

8.3 The infilling of the enclosure ditch illustrated some complexity, with a number of clearly differentiated deposits visible. It had been assumed that the backfilling took place over a continuous, extended period with two periods of stability and soil formation, but whilst there may have been continuous deposition during an earlier period of disuse, study of the stratigraphy and OSL dating indicate that at a later date there may have been secondary re-use of the ditch, possible re-cutting and an altogether more complex backfilling sequence. The monument complex comprising the ditched enclosure, possible internal burial and external postholes bears some resemblance to funerary monuments recorded elsewhere in Devon (e.g. Weddell 2000). However, these monuments are generally thought to be of early medieval date, whereas the example from Uplowman Road appears to have origins in the Romano-British period, but with a possible later re-use. Using information gleaned from addressing Objective 1 above, along with further documentary research, it is hoped that the site can be better understood and integrated into the regional landscape. A more detailed analysis of the full infilling sequence at a number of locations is therefore required, with reference to the limited dating provided by the artefactual evidence and OSL dating. Unfortunately none of the environmental samples yielded material suitable for radiocarbon dating

9 PUBLICATION

9.1 The results from the investigations of the land off Uplowman Road, Tiverton, Devon are of local and regional significance and merit publication. Of particular importance is the ditched enclosure and possible internal grave; if analysis demonstrates that this was indeed a burial and of the date suggested, it would significantly pre-date similar monuments in Devon and may even have been a precursor to such monuments. It is proposed that a short report is published in the *Proceedings of The Devon Archaeological Society*.

Synopsis of Proposed Report

Archaeological Investigations on Land off Uplowman Road, Tiverton, Devon

by Peter Boyer and Jeremy Austin

		Words
Introduction		500
Excavation Results		
	Roman	1000
	Post-Roman	500
Discussion		1500
Bibliography		1000
	Total words	***4500***
	Approximate pages @ 800 words/page	6
		Pages
Illustrations		
	Location of site	0.5
	Site plan with phasing	1
	Site photo	0.5
	Sections	1
Total publication estimate		**9 pages**

PROJECT TEAM

9.2 The analysis and publication programme will be quality assured by **Karen Walker MCIfA** (Principal Post-Excavation Manager) and managed by **Peter Boyer MCIfA** (Post-excavation Manager: PXM), who will contribute to the discussion as senior author and co-ordinate the work of the following personnel:

Jeremy Austin (Project Officer: PO):
Post-excavation phasing, draft report preparation, research and archive

Dan Bashford (Senior Illustrator: ILL):
Production of all site plans, sections and artefact drawings (exc. pottery)

9.3 The final publication report will be edited and refereed internally by CA senior project management.

10 TASK LIST

TASK	PERSONNEL	DURATION/ COST
Project Management	PXM	1.5
Quality Assurance	HoP	0.25
Preparation of publication report		
Abstract and introduction	PO	0.25
Excavation results	PO	2
Research, comparanda	PO	2
Compilation of report, figures etc.	PO	0.5
Acknowledgements, bibliography	PO	0.25
Illustrations	SI	1.5
Submission to external referees		
Editing	PXM	1
SUBMISSION OF PUBLICATION TEXT		
Archive		
Deposition	Archives Officer	1
Deposition	RAMM	FEE
Deposition	ADS	FEE
Publication		
Printing	PDAS	FEE

11 TIMETABLE

11.1 For a summary publication report, CA would normally aim to have completed a publication draft within six months of approval of the updated project design. A detailed programme can be produced if desired on approval of the updated publication project design.

12 REFERENCES

AC Archaeology 2009 *Tiverton Eastern Urban Expansion Area. Archaeology and Cultural Heritage Assessment and Evaluation* Report No. **ACD30/20**

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CA (Cotswold Archaeology) 1995 *Treatment of finds immediately after excavation: Technical Manual No. 3*

CA (Cotswold Archaeology) 2012a *The taking and processing of environmental and other samples from archaeological sites: Technical Manual No. 2*

CA (Cotswold Archaeology) 2012b *Land East of Tiverton, Tiverton, Devon: Archaeological Evaluation* Report No. **12369**

CA (Cotswold Archaeology) 2014 *Land East of Tiverton, Tiverton, Devon: Heritage Desk-Based Assessment and Settings Assessment* Report No. **14139**

CA (Cotswold Archaeology) 2017 *Fieldwork Recording Manual Technical Manual No. 1*

CA (Cotswold Archaeology) 2018 *Land off Uplowman Road, Tiverton, Devon: Written Scheme of Investigation for an Archaeological Excavation*

CIfA (Chartered Institute of Archaeologists) 2014 *Standard and Guidance for Archaeological Excavation*

Historic England 2015a *The Management of Research Projects in the Historic Environment: The MORPHE Project Manager's Guide*

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Webster, C.J. (ed.) 2008b 'Early Medieval', in Webster (a), 169-88

Weddell, P.J. 2000 'the Excavation of a Post-Roman Cemetery near Kenn, South Devon', *Proceedings of the Devon Archaeological Society* **58**, 93-126

APPENDIX 1: STRATIGRAPHIC ASSESSEMENT BY PETER BOYER

A total of 85 contexts were recorded during the excavation. Single context numbers were assigned to the natural substrate, colluvium, subsoil and topsoil, and the remaining contexts were assigned to periods as detailed below:

Period	**No. of contexts**
Period 1 Romano-British	64
Period 2 Early Medieval	2
Period 3 Post-Medieval	7
Undated	8
Total	81

Potential for further analysis

Despite only five contexts providing dateable material, it has been possible to provisionally phase the majority of archaeological contexts. This has been primarily done on the basis of spot dates from recovered artefacts, OSL dating and spatial/stratigraphic relationships to those features containing dateable artefacts and or yielding OSL dates.

Further detailed stratigraphic analysis on enclosure ditch sequences, along with the limited artefactual evidence and OSL dates means that a more refined phasing of the ditch infilling sequence can probably be achieved, meaning that some contexts may ultimately be re-phased. In order to achieve this, further stratigraphic analysis will be undertaken on a total of 38 contexts provisionally assigned to Periods 1 and 2. Further analysis will not be required for contexts dating to the post-medieval period.

APPENDIX 2: LITHICS BY JACKY SOMMERVILLE

Introduction and methodology

A total of three worked lithics (32g) was recovered from the hand excavation of three separate deposits. The artefacts were recorded according to broad artefact/debitage type and catalogued directly onto a Microsoft Access database. Attributes recorded include: raw material; weight; degree of edge damage (microflaking) and rolling (abrasion) colour; cortex description; and the presence of breakage and burning.

Raw material

All items are made using brown or grey-coloured flint. Two are moderately fine-grained and the other is rather coarse. Cortex is present on two items – on one it is chalky, suggesting a chalk or clay-with-flints source, and on the other it is 'chattered' (bruised/pitted), which indicates a pebble source from beach or river gravels.

Provenance and condition

The three lithics were recorded from topsoil 600, fill 621 of ditch 617 and fill 668 of ditch 672. The ditches are most likely of late prehistoric date (see Pottery report). The shatter piece from ditch 672 is burnt and it is not possible to comment otherwise on its condition. As the other two items are in a minimally edge damaged and rolled condition, it is likely that although they are residual, they have undergone minimal disturbance.

Range and variety

The lithics comprise a broken flake from ditch 617, a core rejuvenation flake from topsoil and a piece of burnt shatter from ditch 672. Rejuvenation of the striking platform on the core is a feature of Mesolithic and Early Neolithic lithic reduction. The other two items are not chronologically diagnostic.

Statement of potential

The lithic assemblage from Uplowman Road, Tiverton is very small and redeposited. It provides evidence of activity during the prehistoric period and specifically of flint knapping during the Mesolithic or Early Neolithic period. Any publication on the site should include a summary of the findings described here. No further recording, research or illustrations are necessary.

APPENDIX 3: POTTERY BY KATIE MARSDEN AND E. R. MCSLOY

Introduction

A small assemblage comprising four sherds, weighing 26g, was recovered from three deposits. The pottery was fully recorded in accordance with the Guidelines of the Prehistoric Ceramics Research Group (PCRG 2010). Details include fabric, vessel form (profile) and rim morphology, and where applicable decoration and evidence for vessel use. Fabric codes used in recording are defined below.

Condition

The condition of the pottery is poor, all sherds are small and have suffered surface loss due to abrasion or as the result of the burial environment. A single featured (rim) sherd was recorded, in fabric R1 from ditch 645 (fill 652).

Assemblage range and dating

Two fabric groups were recognised; grey-firing fabrics containing sparse quartz (GW1 and GW2) and argillaceous inclusions which were recorded from deposits 623 (fill of ditch 617) and 667 (fill of ditch 672), and a darker-fired type (R1) more densely-packed with mineral inclusions, identified from deposit 652 (fill of ditch 645). None of the fabrics can be positively matched to those in the Roman pottery type series for Exeter (Holbrook and Bidwell 1991), or to other published descriptions from the area, however a local source is likely. The single recorded rim (in fabric R1) comes from a vessel probably of neckless, barrel-shaped or globular profile and with short, everted/pointed rim. The vessel form suggests dating spanning the Late Iron Age/Early Roman periods (1st centuries BC/AD). Fabrics GW1-2 are represented by unfeatured bodysherds and broad Roman (*c*. 50-400 AD) is suggested.

Fabrics

R1: Handmade. Dark grey/brown throughout. Contains common, moderately-sorted, sub-rounded mixed soft rock inclusions (0.5-1mm), sparse flat slatey inclusions and sparse quartz. 1 sh; 12g.

GW1: Pale grey surfaces with darker core. Contains common sub-rounded clay pellet or soft rock and sparse sparse, sub-rounded clear quartz, within a silty clay matrix. 2 sh; 12g.

GW2: Similar to GW1, but dark grey/brown fired and sparse clay pellet/soft rock inclusions. 1 sh; 2g.

Statement of potential and recommendations for further analysis

The pottery group is small and provides only broad dating evidence. The rim sherd represents the only identifiable vessel form from the site and should be drawn for publication; a short accompanying summary can also be included, which can be adapted from the report presented here.

Reference

Holbrook, N. and Bidwell, PT, 1991. *Roman Finds from Exeter.* Exeter Archaeological Reports No 4

APPENDIX 4: ENVIRONMENTAL SAMPLE ASSESSMENT BY SARAH. F. WYLES

A series of seven environmental samples (143 litres of soil) were taken from a possible grave and from five ditch sections of a surrounding square enclosure, all of possible Romano-British date with the intention of recovering funerary remains and any environmental evidence of industrial or domestic activity on the site. The samples were processed by standard flotation procedures (CA Technical Manual No. 2).

In addition a series of three monoliths were taking through two of the ditch sections of the square enclosure.

Preliminary identifications of plant macrofossils are noted in Table 1, following nomenclature of Stace (1997) for wild plants, and traditional nomenclature, as provided by Zohary *et al* (2012) for cereals.

The flots varied in size with moderately low to moderate quantities of rooty material and modern seeds. The charred material comprised varied levels of preservation.

?Romano-British

Possible Grave 624

The small charred assemblages recovered from fill 625 (samples 1 and 2) of possible grave 624 included Ericaceae type stem fragments, parenchyma fragments and a few charcoal pieces greater than 2mm. These assemblages may be reflective of dispersed material. There was no indication from the samples that this feature may have been a grave.

Square Enclosure

Low numbers of charred plant remains and charcoal were recorded from the lower fills of ditch cuts 630 (slot F), 645 (slot B), 659 (slot D), 672 (slot A) and 677 (slot C) (samples 3-7 respectively). These included hulled wheat, emmer or spelt (*Triticum dicoccum/spelta*), glume base fragments, tuber fragments, Ericaceae type stem fragments and a few charcoal fragments greater than 2mm. Again these assemblages may be representative of dispersed material. These assemblages provide no clear indication of the likely function of the square enclosure nor is there any indication from the environmental remains of any settlement activity taking place in the immediate vicinity.

Potential and recommendations

Further analysis of the charred plant assemblages has no potential to provide more information on the nature of the site, the range of crops and local crop processing activities and the surrounding environment due to the paucity of remains recovered. No further work is recommended on these samples.

There is little potential for charcoal analysis to provide detailed information on the species composition and the management and exploitation of the local woodland resource due to the sparse quantities recovered. No further work is recommended.

Detailed sedimentary descriptions of the monoliths should be considered at the analysis phase to assist with the interpretation of this feature, if the osl samples have successfully dated the ditch sequence and possible stabilisation layers. There is no suitable material in these samples for radiocarbon dating.

References

Stace, C. 1997 *New flora of the British Isles* (2nd edition), Cambridge: Cambridge University Press.

Zohary, D., Hopf, M. and Weiss, E. 2012 *Domestication of plants in the Old World: the origin and spread of cultivated plants in West Asia, Europe, and the Nile Valley*, 4th edition, Oxford, Clarendon Press

Table 1 Assessment table of the palaeoenvironmental remains

Feature	Context	Sample	Vol (L)	Flot size (ml)	Roots %	Grain	Chaff	Charred Other	Notes for Table	Charcoal > 4/2mm	Other
?Romano-British											
Possible Grave											
624	625	1	19	40	50	-	-	*	Parenchyma frags, Ericaceae type stem frag	*/*	-
	625	2	18	10	50	-	-	*	Ericaceae type stem frag	*/*	-
Enclosure ditch											
630	631	3	24	5	40	-	*	-	Glume base frags	*/*	-
645	648	4	18	10	10	-	-	*	Tuber frags	-/*	-
659	662	5	16	5	10	-	-	-	-	*/*	-
672	671	6	30	10	20	-	-	*	Ericaceae type stem frag	*/*	-
677	678	7	18	5	20	-	-	-	-	*/*	-

Key: * = 1–4 items; ** = 5–19 items; *** = 20–49 items; ****= 50–99 items; ***** = >100 items,

APPENDIX 5: GEOARCHAEOLOGICAL AND POLLEN ASSESSMENT BY MICHAEL GRANT

Introduction

In May 2018 Cotswold Archaeology (CA) commissioned Dr Michael Grant, COARS, to undertake sediment recording and pollen assessment of three monoliths sampled from sections [617] and [645] of an enclosure ditch encountered during archaeological investigations at land off Uplowman Road, Tiverton, Devon.

Assessment Aims

The geoarchaeological assessment has been undertaken with the following aims:

- Record the sediments sampled within the ditch interventions; and
- Identify samples that may be suitable for pollen assessment.

The pollen assessment has been undertaken with the following aims:

- Ascertain whether pollen is preserved within the sample submitted for assessment; and
- Provide an interpretation of the local environment based upon the pollen assemblage

Methodology

Sequences from two slots through the enclosure ditch were selected for geoarchaeological recording:

- Slot E [cut 617]: Monolith <10>
- Slot B [cut 645]: Monoliths <8> and <9>

The geoarchaeological assessment followed the guidelines given in Historic England (2015), with descriptions according to Hodgson (1997) including sediment type, depositional structure, texture and colour. Interpretations regarding mode of deposition, formation processes, likely environments represented and potential for palaeoenvironmental analysis were also noted. The results have been tabulated and are given below. A photographic record of the samples, including key stratigraphic features, has been made to supplement the sedimentary descriptions. Dating of sections [617] and [645] have been undertaken using OSL (see Table 1).

Table 1. OSL dating from Sections [617] and [645]

Section and Context	Lab Code	Total D_r (Gy ka^{-1})	D_e (Gy)	Age (ka)	Date
[617] (621)	GL17086	1.97 ± 0.18	4.1 ± 0.2	2.08 ± 0.21 (0.19)	280 BC to AD 150
[646] (653)	GL17087	2.47 ± 0.23	2.9 ± 0.2	1.19 ± 0.14 (0.13)	AD 690 to 970

Pollen Assessment

Standard preparation procedures were used (Moore *et al*. 1991). A total of six samples were selected for preparation (see Table 2). 4cm^3 of sediment was processed from each sample. To each sample a *Lycopodium* spike added (two tablets from batch 3862) to allow the calculation of pollen concentrations (Stockmarr 1971). All samples received the following treatment: 20 mls of 10% KOH (80°C for 30 minutes); 20mls of 60% HF (80°C for 120 minutes); 15 mls of acetolysis mix (80°C for 3 minutes); stained in 0.2% aqueous solution of safranin and mounted in silicone oil following dehydration with tert-butyl alcohol. Due to the highly minerogenic nature of these samples additional sieving and decanting was undertaken between the KOH and HF stages.

Table 2. List of pollen samples assessed

Sample Number	Sample Number	Context Number
Pol_1	<8>	(653)
Pol_2	<8>	(651)
Pol_3	<9>	(648)
Pol_4	<9>	(648)
Pol_5	<10>	(621)
Pol_6	<10>	(620)

Pollen counting was undertaken at a magnification of x400 using a Nikon transmitted light microscope. Determinable pollen and spore types were identified to the lowest possible taxonomic level with the aid of a reference collection kept at COARS, University of Southampton. The pollen and spore types used are those defined by Bennett (1994; Bennett *et al*. 1994), with the exception of Poaceae which follow the classification given by Küster (1988), with Cerealia-type grains further classified using Andersen (1979) with plant nomenclature ordered according to Stace (2010). A total land pollen (TLP) sum of 100 grains was sought for the pollen assessment, but was only achieved for one of the six samples (Pol_6).

Results

Geoarchaeological Recording

A description of the monoliths samples taken from the enclosure ditch are provided in Table 3 and Table 4. The predominant grain size is a silty-clay, although there is a higher proportion of sand size fraction associated with the basal contexts probably associated with primary fill. Visible organics were absent from the two monolith sequences with no evidence of rooting or buried soil formation present either. Within the middle of both monolith sequences are contexts dominated by the inclusion of large angular sandstone, probably derived from the local Permian Tidcombe Sand Member, part of the Exeter Group. These large angular clasts suggest the slumpings of material into the enclosure ditch indicative of a secondary fills, probably derived originally from the excavation of the trench itself and which was placed on its margin to form a bank. OSL dating (Table 1) from these two sections of the enclosure ditch indicate that the main stone clast deposition phase associated with context [621] in section [617] occurred during the Late Iron Age to early Roman period, 280 BC to AD 150 (GL17086). A later date, AD 690 to 970 (GL17087), is derived from context [653] in section [645]. However this context is located above the main sandstone-clast rich layer and could therefore reflect a later phase of sedimentation within the enclosure ditch, with the date from section [617] associated with an earlier fill soon after the enclosure trench was cut / site abandoned. However there is no buried soil visible in either monolith sequence to suggest a period of site stability between these two phases, which could suggest a longer more protracted phase of infilling of the enclosure trench in this location.

Pollen Assessment

The pollen identified and their respective counts are shown in Table 5. Pollen concentrations were very low in all six samples with only sample, from context (620), exceeding 2270 grains cm^{-3}. The lowest pollen concentrations were found in the basal sample Pol_3 from context (648) where a pollen count of only 9 grains was achieved, with pollen concentration of 420 grains cm^{-3}. Along with low pollen concentrations, pollen preservation was also fairly poor with the pollen assemblage largely dominated by pollen types that are more resistant to corrosion (e.g. *Cichorium intybus*-type; dandelions).

Percentages have not been calculated as the desired 100 TLP sum was only obtained in one sample, Pol_6. Pollen preservation was poor in all six samples, although a high abundance of fungal spores was noted in several samples. The fungal presence may be due to them being less susceptible to corrosion than pollen and could suggest low water tables leading to the deterioration of the pollen. Of the pollen identified, the taxa present were largely restricted to Poaceae (grasses) and pollen typically better represented in poorly preserved assemblages, such as *Cichorium intybus*-type. Some indicators of local disturbance were also present in most samples, such as *Plantago lanceolate* (ribwort plantain), along with some occurrences of cereal-type pollen within the uppermost fills. Pollen of trees and shrubs was almost completely absent suggesting potentially a largely open environment.

Potential

Pollen preservation and counts were low and there is little potential for obtaining a palaeoenvironmental record from this feature using pollen analysis.

Recommendations

There is no recommendation for any further pollen analysis from the two sampled sequence from the enclosure ditch.

References

Andersen, S.T. 1979 'Identification of wild grass and cereal pollen', *Danmarks Geol Undersøgelse* Arbog, 1978, 69–92

Bennett, K.D. 1994 Annotated catalogue of pollen and pteridophyte spore types of the British Isles. Unpublished manuscript, University of Cambridge.

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Stockmarr, J. 1971 'Tablets with spores used in absolute pollen analysis', *Pollen et Spores* 13, 615-621.

Table 3. Monolith <10>, Northern Section [617]

Top = 85.827m OD	**Description**	**Context**
	0.00 to 0.115m. 2.5YR 5/8 Sandy Clay, no mottles. Very stoney, small to medium sub-angular to sub-rounded stone. No organics present. Abrupt boundary to:	(623)
	0.115 to 0.34m 7.5YR 5/6 Silty clay with very fine 2.5YR 1/1 Black mottles, 1%. Moderately stoney, consisting of both small sub-rounded and large platy angular stones horizontally bedded. No organics present. Gradual boundary to:	(621)
	0.34 to 0.43m 7.5YR 5/6 Silty clay, no mottles. Slightly stoney, small sub-angular to sub-rounded No organics present. Clear boundary to:	(620)
	0.43 to 0.50m 2.5YR 4/8 Sandy clay, no mottles. Moderately stoney, small rounded to sub-rounded stones. No organics present.	(619)

Table 4. Monolith <8> and <9>, Southern Section [645]

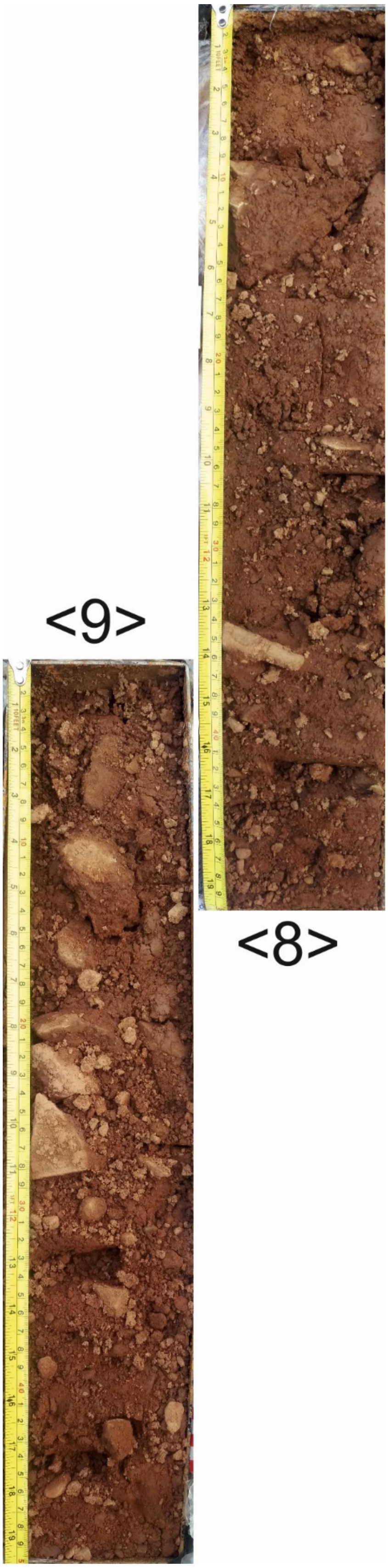
Top = 86.311 m OD	**Description**	**Context**
	0.00 to 0.09m 2.5YR 6/8 Silty clay, no mottles. Slightly stoney, sub-rounded predominantly small, with some medium, stones. No organics. Clear boundary to:	(654)
	0.09 to 0.16m. 2.5YR 6/8 Silty clay, no mottles. Very stoney, large and some very large angular stones. No organics present. Clear boundary to:	(654)
	0.16 to 0.24m 2.5YR 6/8 Silty clay, no mottles. Very slightly stoney, small sub-rounded stones. No organics present. Abrupt boundary to:	(653)
	0.24 to 0.44m 2.5YR 4/6 Clay, no mottles. Very stoney, large platy angular stones and small, occasionally medium, sub-rounded to sub-angular stone. No organics present. Clear boundary to:	(651)
	0.44 to 0.60m 2.5 YR 6/8 Sandy silt loam, no mottles. Slightly stoney, predominantly small sub-rounded with some medium sub-rounded to angular stone. No organics present. Gradual boundary to:	(650)
	0.60 to 0.83m 2.5 YR 5/6 Sandy clay. Moderately stoney, small round to sub-rounded, with occasional medium sub-angular, stones. No organics present.	(648)

Table 5. Pollen counts from Uplowman Road, Tiverton

Pollen Sample	Pol_1	Pol_2	Pol_3	Pol_4	Pol_5	Pol_6
Monolith	8	8	9	9	10	10
Section	645	645	645	645	617	617
Context	653	651	648	648	621	620
Depth (m ODN)	86.051	85.891	85.65	85.54	85.627	85.447
Quercus			1			
Alnus glutinosa						1
Tilia cordata					1	
Corylus avellana-type	2	1	1		1	1
Ranunculus acris-type					1	
Urtica dioica			1			
Brassicaceae	1	1		2		1
Plantago lanceolata	1	2		2	3	3
Cichorium intybus-type	3	3	3	8	19	45
Achillea-type						1
Poaceae undif.	15	8	3	8	20	52
Cerealia-type *(Avena-Triticum* group*)*	1	1			1	
Polypodium	6				1	
Pteridium aquilinum		1		1		
Pteropsida (monolete) indet.	6					
Pre-Quaternary Spores				1		
Corroded	1	2		5		1
Exotic (*Lycopodium*) counted	107	115	103	136	100	83
TLP Sum	23	16	9	20	46	104
Pollen concentration (grains cm^{-3})	1580	710	420	750	2270	6060

APPENDIX 6: OPTICAL DATING BY P. S. TOMS AND J. C. WOOD

Mechanisms and principles

Upon exposure to ionising radiation, electrons within the crystal lattice of insulating minerals are displaced from their atomic orbits. Whilst this dislocation is momentary for most electrons, a portion of charge is redistributed to meta-stable sites (traps) within the crystal lattice. In the absence of significant optical and thermal stimuli, this charge can be stored for extensive periods. The quantity of charge relocation and storage relates to the magnitude and period of irradiation. When the lattice is optically or thermally stimulated, charge is evicted from traps and may return to a vacant orbit position (hole). Upon recombination with a hole, an electron's energy can be dissipated in the form of light generating crystal luminescence providing a measure of dose absorption.

Herein, quartz is segregated for dating. The utility of this minerogenic dosimeter lies in the stability of its datable signal over the mid to late Quaternary period, predicted through isothermal decay studies (e.g. Smith *et al*., 1990; retention lifetime 630 Ma at 20°C) and evidenced by optical age estimates concordant with independent chronological controls (e.g. Murray and Olley, 2002). This stability is in contrast to the anomalous fading of comparable signals commonly observed for other ubiquitous sedimentary minerals such as feldspar and zircon (Wintle, 1973; Templer, 1985; Spooner, 1993).

Optical age estimates of sedimentation (Huntley *et al*., 1985) are premised upon reduction of the minerogenic time dependent signal (Optically Stimulated Luminescence, OSL) to zero through exposure to sunlight and, once buried, signal reformulation by absorption of litho- and cosmogenic radiation. The signal accumulated post burial acts as a dosimeter recording total dose absorption, converting to a chronometer by estimating the rate of dose absorption quantified through the assay of radioactivity in the surrounding lithology and streaming from the cosmos.

$$\text{Age} = \frac{\text{Mean Equivalent Dose } (D_e\text{, Gy})}{\text{Mean Dose Rate } (D_r\text{, Gy.ka}^{-1})}$$

Aitken (1998) and Bøtter-Jensen *et al*. (2003) offer a detailed review of optical dating.

Sample preparation

Two sediment samples were collected within opaque tubing and submitted for Optical dating. To preclude optical erosion of the datable signal prior to measurement, all samples were opened and prepared under controlled laboratory illumination provided by Encapsulite RB-10 (red) filters. To isolate that material potentially exposed to daylight during sampling, sediment located within 20 mm of each tube end was removed.

The remaining sample was dried and then sieved. The fine sand fraction was segregated and subjected to acid and alkaline digestion (10% HCl, 15% H_2O_2) to attain removal of carbonate and organic components respectively. For fine sand fractions, a further acid digestion in HF (40%, 60 mins) was used to etch the outer 10-15 µm layer affected by α radiation and degrade each samples' feldspar content. During HF treatment, continuous magnetic stirring was used to effect isotropic etching of grains. 10% HCl was then added to remove acid soluble fluorides. Each sample was dried, resieved and quartz isolated from the remaining heavy mineral fraction using a sodium polytungstate density separation at 2.68g.cm^{-3}. Twelve 8 mm multi-grain aliquots (*c*. 3-6 mg) of quartz from each sample were then mounted on aluminium discs for determination of D_e values.

All drying was conducted at 40°C to prevent thermal erosion of the signal. All acids and alkalis were Analar grade. All dilutions (removing toxic-corrosive and non-minerogenic luminescence-bearing substances) were conducted with distilled water to prevent signal contamination by extraneous particles.

Acquisition and accuracy of D_e value

All minerals naturally exhibit marked inter-sample variability in luminescence per unit dose (sensitivity). Therefore, the estimation of D_e acquired since burial requires calibration of the natural signal using known amounts of laboratory dose. D_e values were quantified using a single-aliquot regenerative-dose (SAR) protocol (Murray and Wintle 2000; 2003) facilitated by a Risø TL-DA-15 irradiation-stimulation-detection system (Markey *et al*., 1997; Bøtter-Jensen *et al*., 1999). Within this apparatus, optical signal stimulation is provided by an assembly of blue diodes (5 packs of 6 Nichia NSPB500S), filtered to 470±80 nm conveying 15 $mW.cm^{-2}$ using a 3 mm Schott GG420 positioned in front of each diode pack. Infrared (IR) stimulation, provided by 6 IR diodes (Telefunken TSHA 6203) stimulating at 875±80nm delivering ~5 $mW.cm^{-2}$, was used to indicate the presence of contaminant feldspars (Hütt *et al*., 1988). Stimulated photon emissions from quartz aliquots are in the ultraviolet (UV) range and were filtered from stimulating photons by 7.5 mm HOYA U-340 glass and detected by an EMI 9235QA photomultiplier fitted with a blue-green sensitive bialkali photocathode. Aliquot irradiation was conducted using a 1.48 GBq $^{90}Sr/^{90}Y$ β source calibrated for multi-grain aliquots of 125-180 µm quartz against the 'Hotspot 800' ^{60}Co γ source located at the National Physical Laboratory (NPL), UK.

SAR by definition evaluates D_e through measuring the natural signal (Fig. 1) of a single aliquot and then regenerating that aliquot's signal by using known laboratory doses to enable calibration. For each aliquot, five different regenerative-doses were administered so as to image dose response. D_e values for each aliquot were then interpolated, and associated counting and fitting errors calculated, by way of exponential plus linear regression (Fig. 1). Weighted (geometric) mean D_e values were calculated from 12 aliquots using the central age model outlined by Galbraith *et al*. (1999) and are quoted at 1σ confidence (Table 1). The accuracy with which D_e equates to total absorbed dose and that dose absorbed since burial was assessed. The former can be considered a function of laboratory factors, the latter, one of environmental issues. Diagnostics were deployed to estimate the influence of these factors and criteria instituted to optimise the accuracy of D_e values.

Laboratory factors

Feldspar contamination

The propensity of feldspar signals to fade and underestimate age, coupled with their higher sensitivity relative to quartz makes it imperative to quantify feldspar contamination. At room temperature, feldspars generate a signal (IRSL; Fig. 1) upon exposure to IR whereas quartz does not. The signal from feldspars contributing to OSL can be depleted by prior exposure to IR. For all aliquots the contribution of any remaining feldspars was estimated from the OSL IR depletion ratio (Duller, 2003). The influence of IR depletion on the OSL signal can be illustrated by comparing the regenerated post-IR OSL D_e with the applied regenerative-dose. If the addition to OSL by feldspars is insignificant, then the repeat dose ratio of OSL to post-IR OSL should be statistically consistent with unity (Table 1). If any aliquots do not fulfil this criterion, then the sample age estimate should be accepted tentatively. The source of feldspar contamination is rarely rooted in sample preparation; it predominantly results from the occurrence of feldspars as inclusions within quartz.

Preheating

Preheating aliquots between irradiation and optical stimulation is necessary to ensure comparability between natural and laboratory-induced signals. However, the multiple irradiation and preheating steps that are required to define single-aliquot regenerative-dose response leads to signal sensitisation, rendering calibration of the natural signal inaccurate. The SAR protocol (Murray and Wintle, 2000; 2003) enables this sensitisation to be monitored and corrected using a test dose, here set at 5 Gy preheated to 220°C for 10s, to track signal sensitivity between irradiation-preheat steps. However, the accuracy of sensitisation correction for both natural and laboratory signals can be preheat dependent.

The Dose Recovery test was used to assess the optimal preheat temperature for accurate correction and calibration of the time dependent signal. Dose Recovery (Fig. 2) attempts to quantify the combined effects of thermal transfer and sensitisation on the natural signal, using a precise lab dose to simulate natural dose. The ratio between the applied dose and recovered D_e value should be statistically concordant with unity. For this diagnostic, 6 aliquots were each assigned a 10 s preheat between 180°C and 280°C.

That preheat treatment fulfilling the criterion of accuracy within the Dose Recovery test was selected to generate the final De value from a further 12 aliquots. Further thermal treatments, prescribed by Murray and Wintle (2000; 2003), were applied to optimise accuracy and precision. Optical stimulation occurred at 125ºC in order to minimise effects associated with photo-transferred thermoluminescence and maximise signal to noise ratios. Inter-cycle optical stimulation was conducted at 280ºC to minimise recuperation.

Irradiation

For all samples having D_e values in excess of 100 Gy, matters of signal saturation and laboratory irradiation effects are of concern. With regards the former, the rate of signal accumulation generally adheres to a saturating exponential form and it is this that limits the precision and accuracy of D_e values for samples having absorbed large doses. For such samples, the functional range of D_e interpolation by SAR has been verified up to 600 Gy by Pawley *et al*. (2010). Age estimates based on D_e values exceeding this value should be accepted tentatively.

Internal consistency

Abanico plots (Dietze *et al*., 2016) are used to illustrate inter-aliquot De variability (Fig. 3). D_e values are standardised relative to the central D_e value for natural signals and are described as overdispersed when >5% lie beyond ± 2σ of the standardising value; resulting from a heterogeneous absorption of burial dose and/or response to the SAR protocol. For multi-grain aliquots, overdispersion of natural signals does not necessarily imply inaccuracy. However where overdispersion is observed for regenerated signals, the efficacy of sensitivity correction may be problematic. Murray and Wintle (2000; 2003) suggest repeat dose ratios (Table 1) offer a measure of SAR protocol success, whereby ratios ranging across 0.9-1.1 are acceptable. However, this variation of repeat dose ratios in the high-dose region can have a significant impact on D_e interpolation. The influence of this effect can be outlined by quantifying the ratio of interpolated to applied regenerative-dose ratio (Table 1). In this study, where both the repeat dose ratios and interpolated to applied regenerative-dose ratios range across 0.9-1.1, sensitivity-correction is considered effective.

Environmental factors

Incomplete zeroing

Post-burial OSL signals residual of pre-burial dose absorption can result where pre-burial sunlight exposure is limited in spectrum, intensity and/or period, leading to age overestimation. This effect is particularly acute for material eroded and redeposited sub-aqueously (Olley *et al*., 1998, 1999; Wallinga, 2002) and exposed to a burial dose of <20 Gy (e.g. Olley *et al*., 2004), has some influence in sub-aerial contexts but is rarely of consequence where aerial transport has occurred. Within single-aliquot regenerative-dose optical dating there are two diagnostics of partial resetting (or bleaching); signal analysis (Agersnap-Larsen *et al*., 2000; Bailey *et al*., 2003) and inter-aliquot D_e distribution studies (Murray *et al*., 1995).

Within this study, signal analysis was used to quantify the change in D_e value with respect to optical stimulation time for multi-grain aliquots. This exploits the existence of traps within minerogenic dosimeters that bleach with different efficiency for a given wavelength of light to verify partial bleaching. D_e (t) plots (Fig. 4; Bailey *et al*., 2003) are constructed from separate integrals of signal decay as laboratory optical stimulation progresses. A statistically significant increase in natural D_e (t) is indicative of partial bleaching assuming three conditions are fulfilled. Firstly, that a statistically significant increase in D_e (t) is observed when partial bleaching is simulated within the laboratory. Secondly, that there is no significant rise in D_e (t) when full bleaching is simulated. Finally, there should be no significant augmentation in D_e (t) when zero dose is simulated. Where partial bleaching is detected, the age derived from the sample should be considered a maximum estimate only. However, the utility of signal analysis is strongly dependent upon a samples pre-burial experience of sunlight's spectrum and its residual to post-burial signal ratio. Given in the majority of cases, the spectral exposure history of a deposit is uncertain, the absence of an increase in natural D_e (t) does not necessarily testify to the absence of partial bleaching.

Where requested and feasible, the insensitivities of multi-grain single-aliquot signal analysis may be circumvented by inter-aliquot D_e distribution studies. This analysis uses aliquots of single sand grains to quantify inter-grain De distribution. At present, it is contended that asymmetric inter-grain D_e distributions are symptomatic of partial bleaching and/or pedoturbation (Murray *et al*., 1995; Olley *et al*., 1999; Olley *et al*., 2004; Bateman *et al*., 2003). For partial bleaching at least, it is further contended that the D_e acquired during burial is located in the minimum region of such ranges. The mean and breadth of this minimum region is the subject of current debate, as it is additionally influenced by heterogeneity in microdosimetry, variable inter-grain response to SAR and residual to post-burial signal ratios.

Turbation

As noted in section 3.1.1, the accuracy of sedimentation ages can further be controlled by post-burial trans-strata grain movements forced by pedo- or cryoturbation. Berger (2003) contends pedogenesis prompts a reduction in the apparent sedimentation age of parent material through bioturbation and illuviation of younger material from above and/or by biological recycling and resetting of the datable signal of surface material. Berger (2003) proposes that the chronological products of this remobilisation are A-horizon age estimates reflecting the cessation of pedogenic activity, Bc/C-horizon ages delimiting the maximum age for the initiation of pedogenesis with estimates obtained from Bt-horizons providing an intermediate age 'close to the age of cessation of soil development'. Singhvi et al. (2001), in contrast, suggest that B and C-horizons closely approximate the age of the parent material, the A-horizon, that of the 'soil forming episode'. Recent analyses of inter-aliquot De distributions have reinforced this complexity of interpreting burial age from pedoturbated deposits (Lombard *et al*., 2011; Gliganic *et al*., 2015; Jacobs *et al*., 2008; Bateman *et al*., 2007; Gliganic *et al*., 2016). At present there is no definitive post-sampling mechanism for the direct detection of and correction for post-burial sediment remobilisation. However, intervals of palaeosol evolution can be delimited by a maximum age derived from parent material and a minimum age obtained from a unit overlying the palaeosol. Inaccuracy forced by cryoturbation may be bidirectional, heaving older material upwards or drawing younger material downwards into the level to be dated. Cryogenic deformation of matrix-supported material is, typically, visible; sampling of such cryogenically-disturbed sediments can be avoided.

Acquisition and accuracy of D_r value

Lithogenic D_r values were defined through measurement of U, Th and K radionuclide concentration and conversion of these quantities into β and γ D_r values (Table 1). β contributions were estimated from sub-samples by laboratory-based γ spectrometry using an Ortec GEM-S high purity Ge coaxial detector system, calibrated using certified reference materials supplied by CANMET. γ dose rates were estimated from *in situ* NaI gamma spectrometry using an EG&G μNomad portable NaI gamma spectrometer (calibrated using the block standards at RLAHA, University of Oxford); these reduce uncertainty relating to potential heterogeneity in the γ dose field surrounding each sample. The level of U disequilibrium was estimated by laboratory-based Ge γ spectrometry. Estimates of radionuclide concentration were converted into D_r values (Adamiec and Aitken, 1998), accounting for Dr modulation forced by grain size (Mejdahl, 1979) and present moisture content (Zimmerman, 1971). Cosmogenic Dr values were calculated on the basis of sample depth, geographical position and matrix density (Prescott and Hutton, 1994).

The spatiotemporal validity of D_r values can be considered a function of five variables. Firstly, age estimates devoid of *in situ* γ spectrometry data should be accepted tentatively if the sampled unit is heterogeneous in texture or if the sample is located within 300 mm of strata consisting of differing texture and/or mineralogy. However, where samples are obtained throughout a vertical profile, consistent values of γ D_r based solely on laboratory measurements may evidence the homogeneity of the γ field and hence accuracy of γ D_r values. Secondly, disequilibrium can force temporal instability in U and Th emissions. The impact of this infrequent phenomenon (Olley *et al*., 1996) upon age estimates is usually insignificant given their associated margins of error. However, for samples where this effect is pronounced (>50% disequilibrium between ^{238}U and ^{226}Ra; Fig. 5), the resulting age estimates should be accepted tentatively. Thirdly, pedogenically-induced variations in matrix composition of B and C-horizons, such as radionuclide and/or mineral remobilisation, may alter the rate of energy emission and/or absorption. If D_r is invariant through a dated profile and samples encompass primary parent material, then element mobility is likely limited in effect. Fourthly, spatiotemporal detractions from present moisture content are difficult to assess directly, requiring knowledge of the magnitude and timing of differing contents. However, the maximum influence of moisture content variations can be delimited by recalculating D_r for minimum (zero) and maximum (saturation) content. Finally, temporal alteration in the thickness of overburden alters cosmic D_r values. Cosmic D_r often forms a negligible portion of total D_r. It is possible to quantify the maximum influence of overburden flux by recalculating D_r for minimum (zero) and maximum (surface sample) cosmic D_r.

Estimation of age

Ages reported in Table 1 provide an estimate of sediment burial period based on mean De and Dr values and their associated analytical uncertainties. Uncertainty in age estimates is reported as a product of systematic and experimental errors, with the magnitude of experimental errors alone shown in parenthesis (Table 1). Cumulative frequency plots indicate the inter-aliquot variability in age (Fig. 6). The maximum influence of temporal variations in D_r forced by minima-maxima in moisture content and overburden thickness is also illustrated in Fig. 6. Where uncertainty in these parameters exists this age range may prove instructive, however the combined extremes represented should not be construed as preferred age estimates. The analytical validity of each sample is presented in Table 2.

Analytical uncertainty

All errors are based upon analytical uncertainty and quoted at 1σ confidence. Error calculations account for the propagation of systematic and/or experimental (random) errors associated with D_e and D_r values.

For D_e values, systematic errors are confined to laboratory β source calibration. Uncertainty in this respect is that combined from the delivery of the calibrating γ dose (1.2%; NPL, pers. comm.), the conversion of this dose for SiO_2 using the respective mass energy-absorption coefficient (2%; Hubbell, 1982) and experimental error, totalling 3.5%. Mass attenuation and bremsstrahlung losses during γ dose delivery are considered negligible. Experimental errors relate to D_e interpolation using sensitisation corrected dose responses. Natural and regenerated sensitisation corrected dose points (S_i) were quantified by,

$$S_i = (D_i - x.L_i) / (d_i - x.L_i) \qquad \textbf{Eq.1}$$

where D_i = Natural or regenerated OSL, initial 0.2 s
L_i = Background natural or regenerated OSL, final 5 s
d_i = Test dose OSL, initial 0.2 s
x = Scaling factor, 0.08

The error on each signal parameter is based on counting statistics, reflected by the square-root of measured values. The propagation of these errors within Eq. 1 generating σS_i follows the general formula given in Eq. 2. σS_i were then used to define fitting and interpolation errors within exponential plus linear regressions.

For Dr values, systematic errors accommodate uncertainty in radionuclide conversion factors (5%), β attenuation coefficients (5%), a-value (4%; derived from a systematic α source uncertainty of 3.5% and experimental error), matrix density (0.20 $g.cm^{-3}$), vertical thickness of sampled section (specific to sample collection device), saturation moisture content (3%), moisture content attenuation (2%), burial moisture content (25% relative, unless direct evidence exists of the magnitude and period of differing content) and NaI gamma spectrometer calibration (3%). Experimental errors are associated with radionuclide quantification for each sample by NaI and Ge gamma spectrometry.

The propagation of these errors through to age calculation was quantified using the expression,

$$\sigma y\ (\delta y/\delta x) = (\Sigma\ ((\delta y/\delta x_n).\sigma x_n)^2)^{1/2} \qquad \textbf{Eq.2}$$

where y is a value equivalent to that function comprising terms x_n and where σy and σx_n are associated uncertainties.

Errors on age estimates are presented as combined systematic and experimental errors and experimental errors alone. The former (combined) error should be considered when comparing luminescence ages herein with independent chronometric controls. The latter assumes systematic errors are common to luminescence age estimates generated by means identical to those detailed herein and enable direct comparison with those estimates.

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Table 1**.** D_r, D_e and Age data of submitted samples located at c. 51°N, 3°W, 90m. Age estimates expressed relative to year of sampling. Uncertainties in age are quoted at 1σ confidence, are based on analytical errors and reflect combined systematic and experimental variability and (in parenthesis) experimental variability alone (see 6.0). **Blue** indicates samples with accepted age estimates, **red**, age estimates with caveats (see Table 2)

Field Code	Lab Code	Overburden (m)	Grain size (µm)	Moisture content (%)	NaI γ-spectrometry (*in situ*) γ D_r (Gy.ka^{-1})	Ge γ-spectrometry (*ex situ*)			β D_r (Gy.ka^{-1})	Cosmic D_r (Gy.ka^{-1})	Preheat (°C for 10s)	Low Dose Repeat Ratio	Interpolated:Applied Low Regenerative-dose D_e	High Dose Repeat Ratio	Interpolated:Applied High Regenerative-dose D_e	Post-IR OSL Ratio
						K (%)	Th (ppm)	U (ppm)								
TTON03 (CN 621)	GL17086	1.25	125-180	20 ± 5	0.72 ± 0.10	1.35 ± 0.09	7.76 ± 0.52	2.06 ± 0.12	1.08 ± 0.14	0.17 ± 0.02	200	1.01 ± 0.03	1.01 ± 0.02	1.00 ± 0.02	1.00 ± 0.01	1.00 ± 0.03
TTON02 (CN 653)	GL17087	0.02	125-180	19 ± 5	0.87 ± 0.12	1.86 ± 0.11	9.00 ± 0.58	1.95 ± 0.15	1.42 ± 0.17	0.18 ± 0.02	200	0.98 ± 0.03	0.98 ± 0.02	0.99 ± 0.02	0.99 ± 0.02	0.98 ± 0.03

Field Code	Lab Code	Total D_r (Gy.ka^{-1})	D_e (Gy)	Age (ka)	Date
TTON03 (CN 621)	GL17086	1.97 ± 0.18	4.1 ± 0.2	2.08 ± 0.21 (0.19)	280 B.C. – 150 A.D.
TTON02 (CN 653)	GL17087	2.47 ± 0.23	2.9 ± 0.2	1.19 ± 0.14 (0.13)	690 A.D. – 970 A.D.

Table 2. Analytical validity of sample suite age estimates and caveats for consideration

Generic considerations	Field Code	Lab Code	Sample specific considerations
None	TTON03 (CN 621)	GL17086	None
	TTON02 (CN 653)	GL17087	None

Fig. 1 Signal Calibration

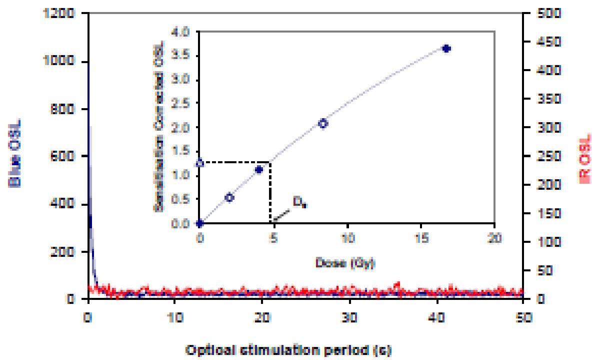

Fig. 2 Dose Recovery

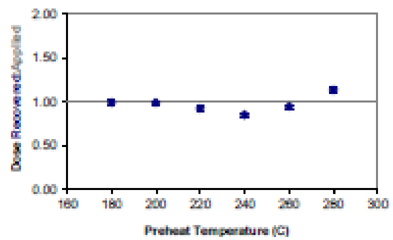

Fig. 4 Signal Analysis

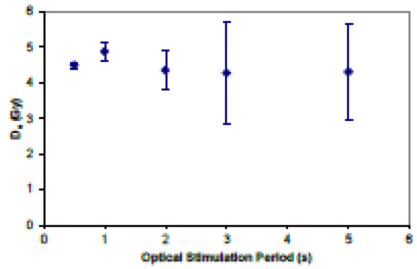

Fig. 3 Inter-aliquot D_e distribution

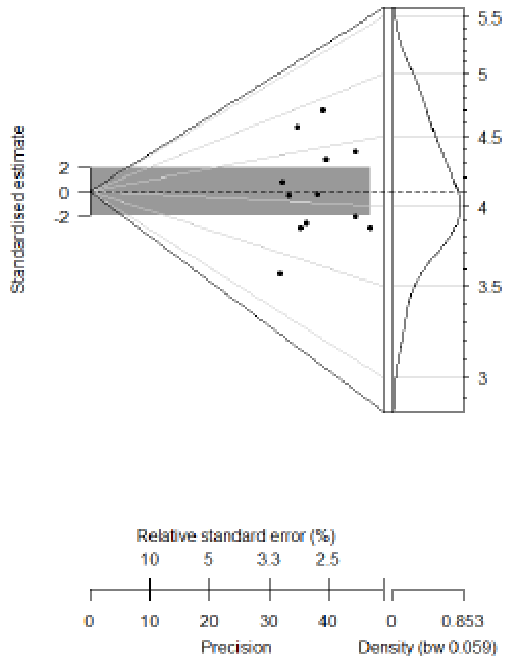

Fig. 5 U Decay Activity

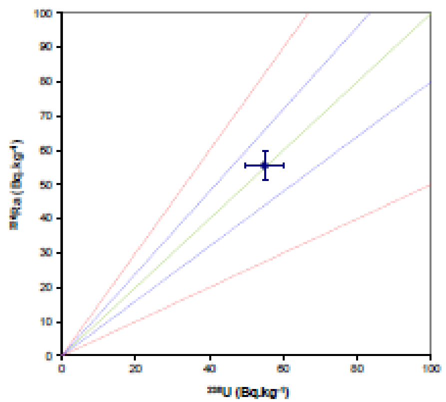

Fig. 6 Age Range

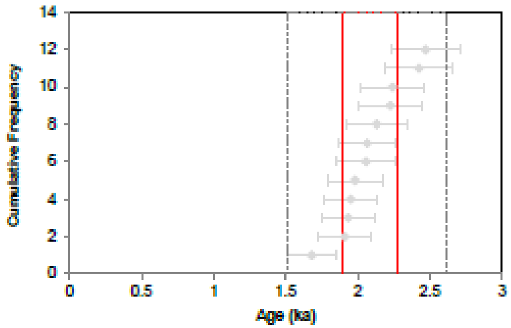

Fig. 1 Signal Calibration Natural blue and laboratory-induced infrared (IR) OSL signals. Detectable IR signal decays are diagnostic of feldspar contamination. Inset, the natural blue OSL signal (open triangle) of each aliquot is calibrated against known laboratory doses to yield equivalent dose (D_e) values. Repeats of low and high doses (open diamonds) illustrate the success of sensitivity correction.

Fig. 2 Dose Recovery The acquisition of D_e values is necessarily predicated upon thermal treatment of aliquots succeeding environmental and laboratory irradiation. The Dose Recovery test quantifies the combined effects of thermal transfer and sensitisation on the natural signal using a precise lab dose to simulate natural dose. Based on this an appropriate thermal treatment is selected to generate the final D_e value.

Fig. 3 Inter-aliquot D_e distribution Abanico plot of inter-aliquot statistical concordance in D_e values derived from natural irradiation. Discordant data (those points lying beyond ±2 standardised in D_e) reflect heterogeneous dose absorption and/or inaccuracies in calibration.

Fig. 4 Signal Analysis Statistically significant increase in natural D_e value with signal stimulation period is indicative of a partially-bleached signal, provided a significant increase in D_e results from simulated partial bleaching followed by insignificant adjustment in D_e for simulated zero and full bleach conditions. Ages from such samples are considered maximum estimates. In the absence of a significant rise in D_e with stimulation time, simulated partial bleaching and zero/full bleach tests are not assessed.

Fig. 5 U Activity Statistical concordance (equilibrium) in the activities of the daughter radioisotope ^{226}Ra with its parent ^{238}U may signify the temporal stability of D_r emissions from these chains. Significant differences (disequilibrium; >50%) in activity indicate addition or removal of isotopes creating a time-dependent shift in D_r values and increased uncertainty in the accuracy of age estimates. A 20% disequilibrium marker is also shown.

Fig. 6 Age Range The Cumulative frequency plot indicates the inter-aliquot variability in age. It also shows the mean age range; an estimate of sediment burial period based on mean D_e and D_r values with associated analytical uncertainties. The maximum influence of temporal variations in D_r forced by minima-maxima variation in moisture content and overburden thickness is outlined and may prove instructive where there is uncertainty in these parameters. However the combined extremes represented should not be construed as preferred age estimates.

Sample: GL17086

Fig. 1 Signal Calibration

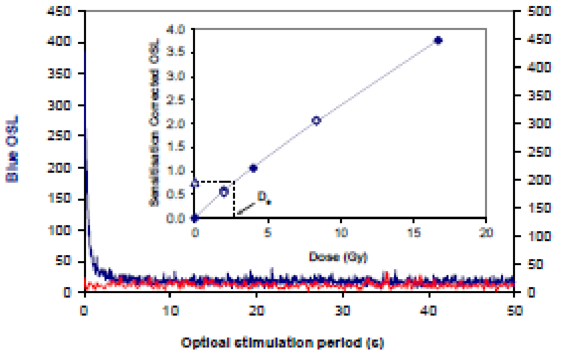

Fig. 2 Dose Recovery

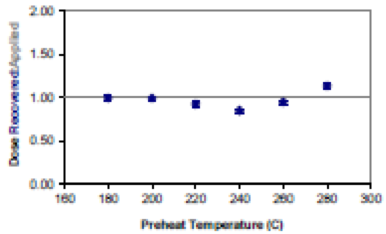

Fig. 3 Inter-aliquot D_e distribution

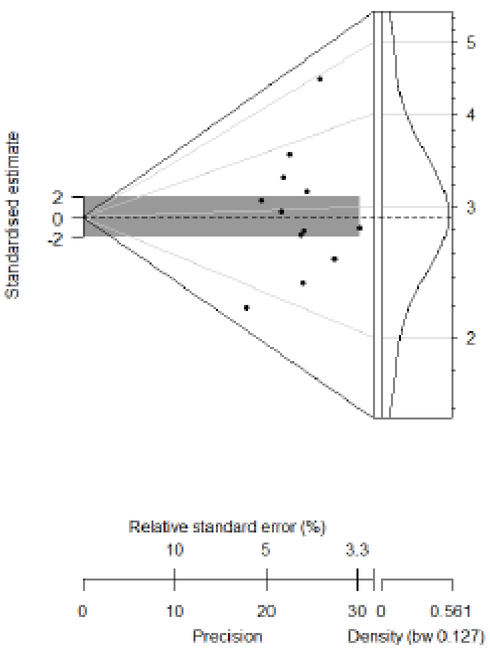

Fig. 4 Signal Analysis

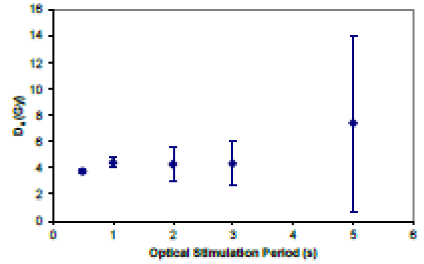

Fig. 5 U Decay Activity

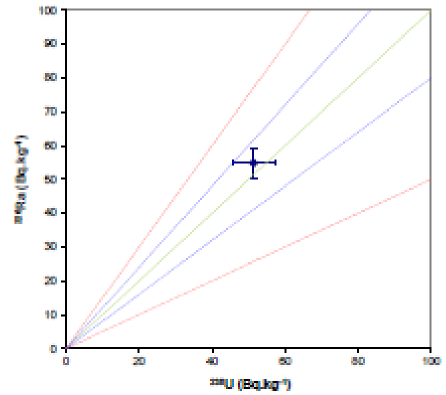

Fig. 6 Age Range

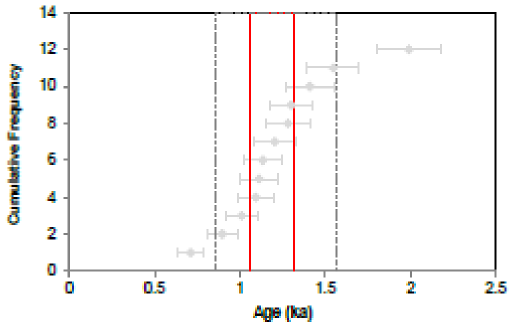

Fig. 1 Signal Calibration Natural blue and laboratory-induced infrared (IR) OSL signals. Detectable IR signal decays are diagnostic of feldspar contamination. Inset, the natural blue OSL signal (open triangle) of each aliquot is calibrated against known laboratory doses to yield equivalent dose (D_e) values. Repeats of low and high doses (open diamonds) illustrate the success of sensitivity correction.

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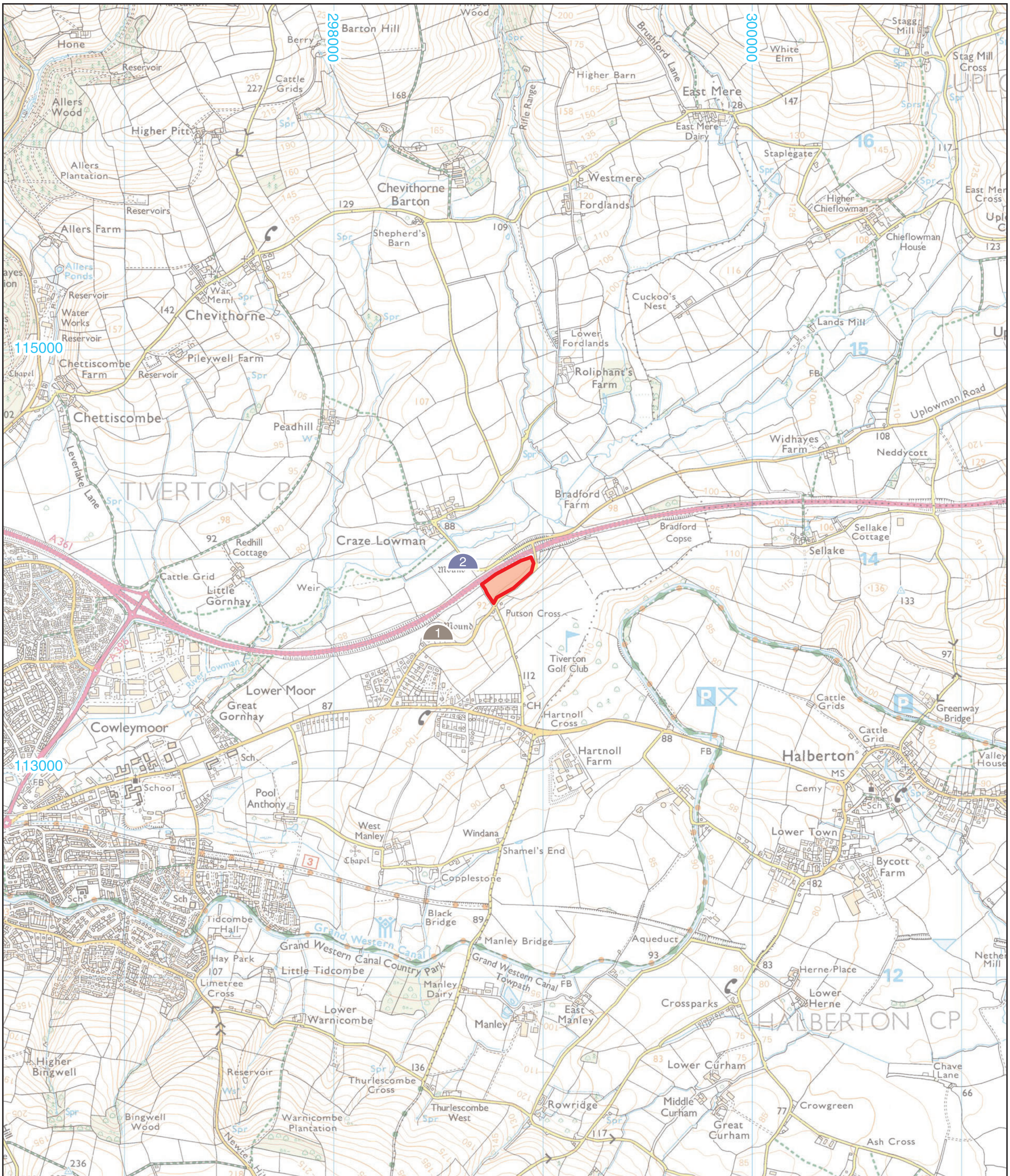
Sample: GL17087

APPENDIX 7: OASIS REPORT FORM

PROJECT DETAILS	
Project Name	Land off Uplowman Road, Tiverton, Devon
Short description	A programme of archaeological investigation was undertaken by Cotswold Archaeology in January and February 2018 at the request of Barratt David Wilson Homes on land off Uplowman Road, Tiverton, Devon. An area of approximately 530 square metres was excavated within the development site. The investigation revealed a sub-square ditched enclosure with external dimensions measuring 11.25m by 10.5m and a possible narrow entrance to the east. The ditch contained multiple backfilling deposits but only yielded a small pottery assemblage, which indicated a broad Roman date of deposition. Optical stimulated luminescence (OSL) dating of one deposit indicated a broad late prehistoric to early Roman date, whilst another deposit produced an OSL date indicating secondary re-use in the early medieval period. Centrally placed within the enclosed area was a possible grave pit, aligned with the eastern entrance, though no definitive evidence of a burial was present and no dateable finds were recovered. A row of undated postholes east of the enclosure also appeared to be associated features. An apparent curvilinear ditch and an irregular pit to the north of the enclosure did not appear to be associated with it and were undated. Two linear ditches were of post-medieval date; one associated land division and the other a field drain.
Project dates	16 January 2018 – 6 February 2018
Project type	Excavation
Previous work	Geophysical survey (AC Archaeology 2009) Field evaluation (AS Archaeology 2009) Field evaluation (CA 2012) DBA (CA 2014)
Future work	Unknown
PROJECT LOCATION	
Site Location	Uplowman Road/ Tiverton/ Mid Devon/ Devon
Study area (M^2/ha)	530 M^2
Site co-ordinates	298825 113928
PROJECT CREATORS	
Name of organisation	Cotswold Archaeology
Project Brief originator	Devon County Council
Project Design (WSI) originator	Cotswold Archaeology
Project Manager	Derek Evans
Project Supervisor	Jeremy Austin
MONUMENT TYPE	Ditch – Roman Pit – Roman Posthole – Roman Ditch – Post-medieval Ditch – undated Pit - undated
SIGNIFICANT FINDS	Flint – prehistoric Pottery - Roman

PROJECT ARCHIVES	Intended final location of archive (museum/Accession no.)	Content (e.g. pottery, animal bone etc)
Physical	Will be offered to Royal Albert Memorial Museum (RAMM)	Flint, ceramics
Paper		
Digital	Royal Albert Memorial Museum (RAMM)	Database, scanned rpaper records, digital photos, survey data
BIBLIOGRAPHY		
CA (Cotswold Archaeology) 2019 L*and off Uplowman Road, Tiverton, Devon: Archaeological Excavation.* CA typescript report **889017_1**		



N

(red outline)	Site boundary
1	Neolithic long barrow
2	Bronze age bowl barrow

0 — 1km

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PROJECT TITLE
Land off Uplowman Road, Tiverton, Devon

FIGURE TITLE
Site location plan

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CHECKED BY	DJB	*DATE*	13.08.19
APPROVED BY	PB	*SCALE@A4*	1:25,000

FIGURE NO. 1

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PROJECT TITLE
Land off Uplowman Road, Tiverton, Devon

FIGURE TITLE
The site, showing geophysical survey results and previous trial trench locations

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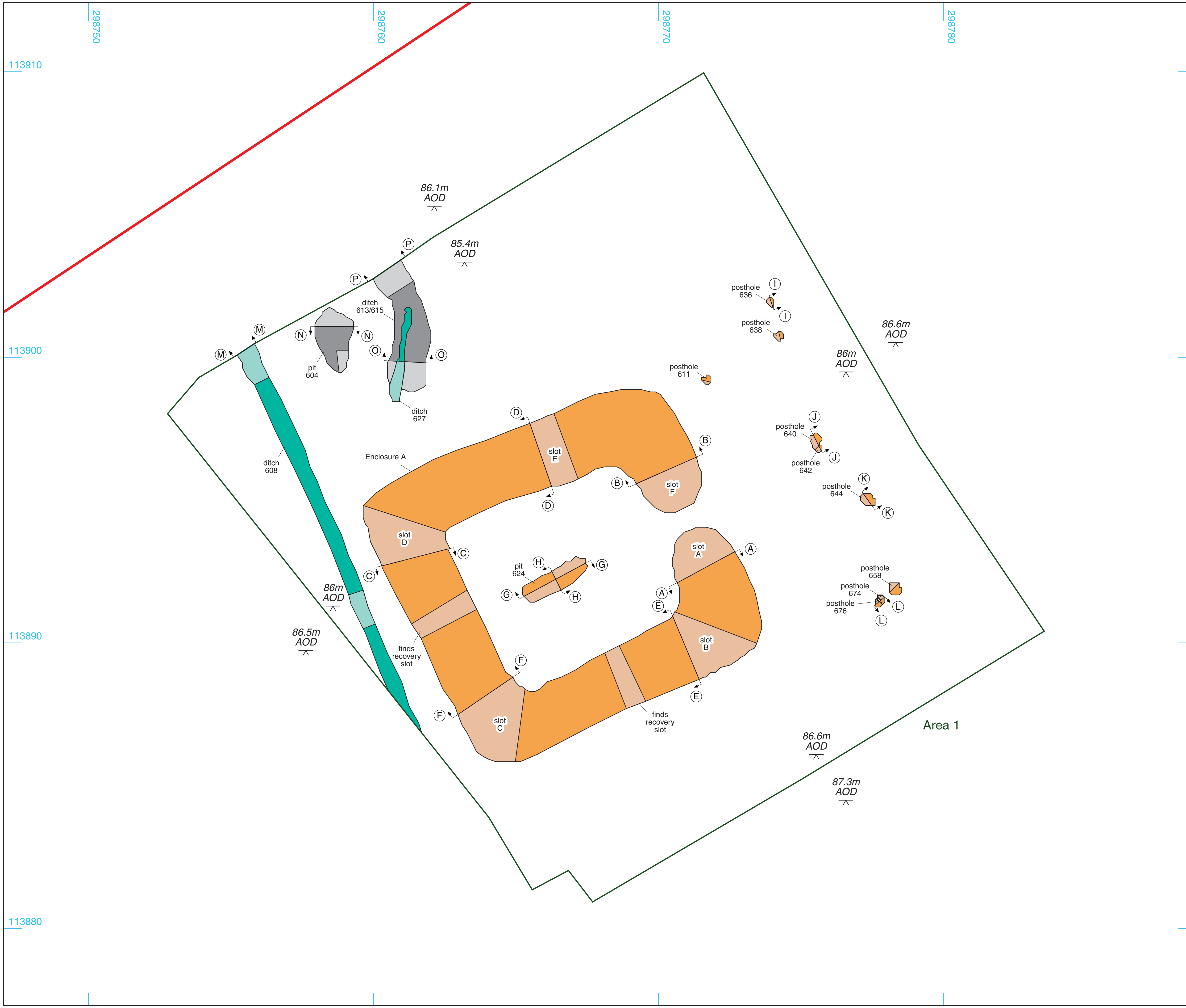
APPROVED BY	PB	SCALE@A3	1:1000	



N

Site boundary

Evaluation area

Archaeological features:
(excavated/unexcavated)

Period 1: Romano-British

Period 3: Post-medieval

Undated

Section location

0 1:125 5m

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PROJECT TITLE
Land off Uplowman Road, Tiverton, Devon

FIGURE TITLE
Phased feature plan

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FIGURE NO.
3

The enclosure, looking south-west (1m scales)

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PROJECT TITLE

Land off Uplowman Road, Tiverton, Devon

FIGURE TITLE

Photograph of the enclosure

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APPROVED BY	**DE**	*SCALE@A4*	**NA**	

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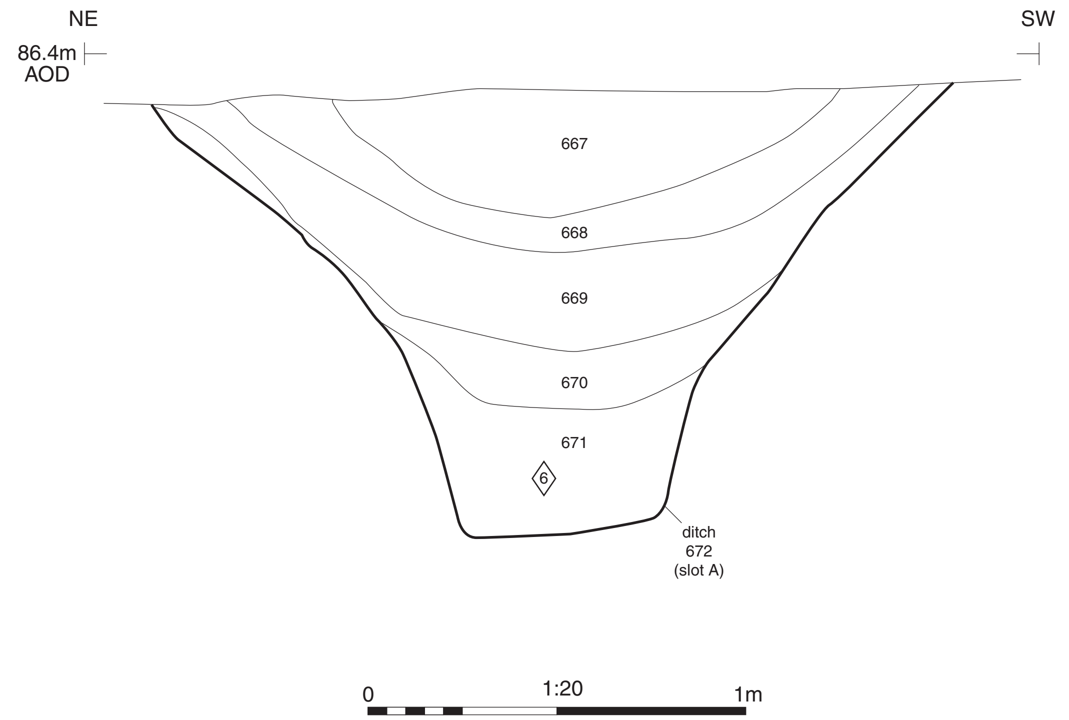

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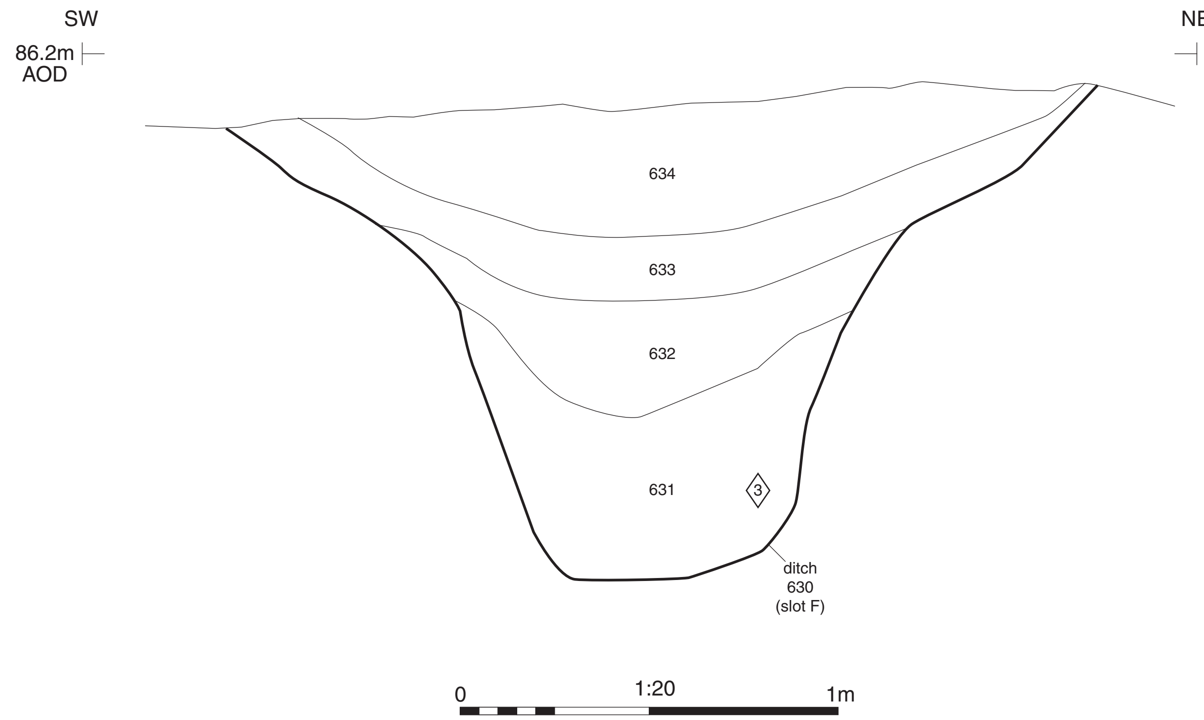

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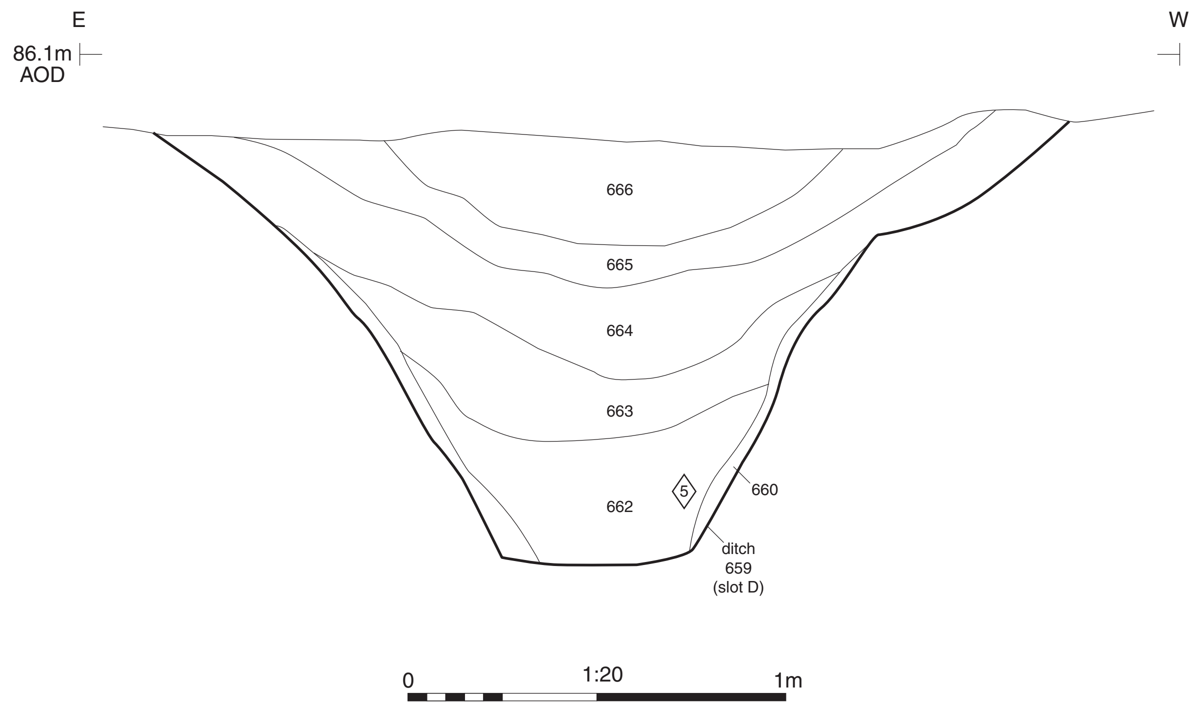

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PROJECT TITLE

Land off Uplowman Road, Tiverton, Devon

FIGURE TITLE

Enclosure ditch sections

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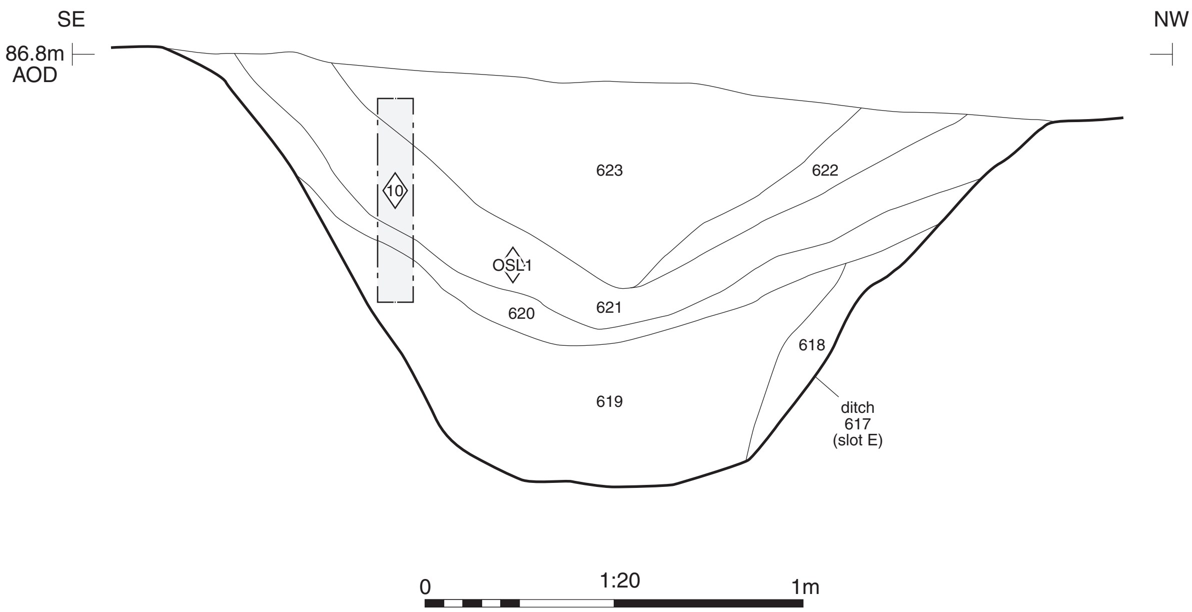
APPROVED BY	**PB**	*SCALE@A3*	**1:20**

FIGURE NO.

5

Ditch 617 (slot E), looking south-west (1m scale)

Section DD



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PROJECT TITLE
Land off Uplowman Road, Tiverton, Devon

FIGURE TITLE
Photograph and section

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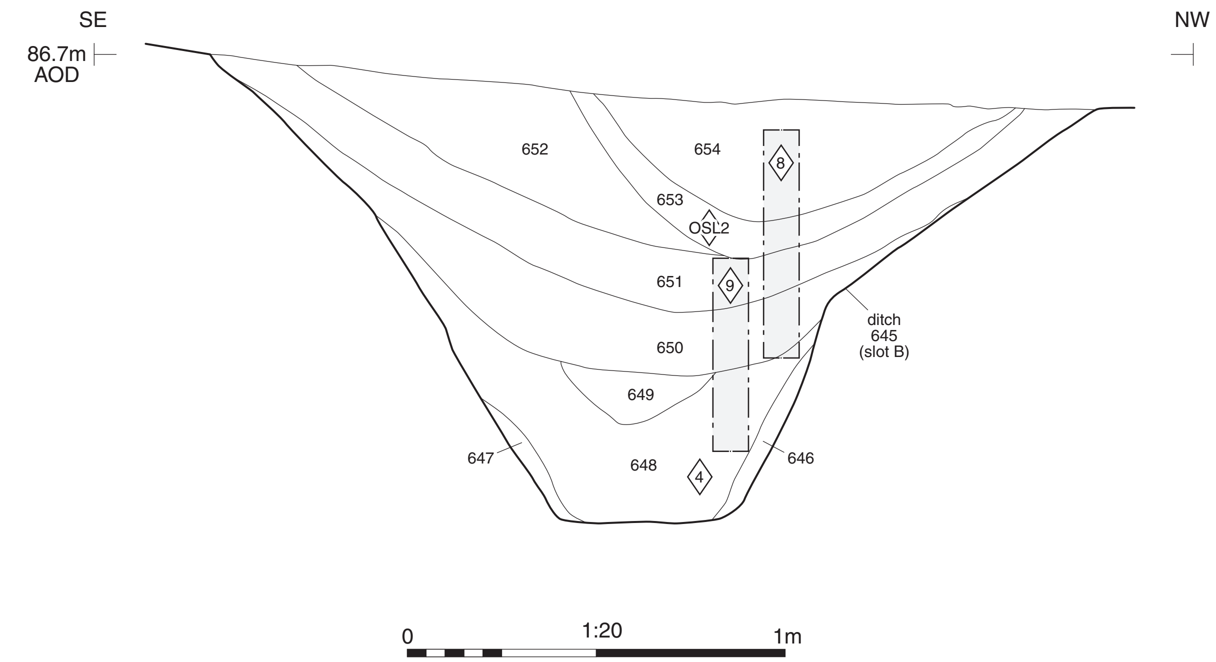
APPROVED BY	DE	SCALE@A4	1:20	

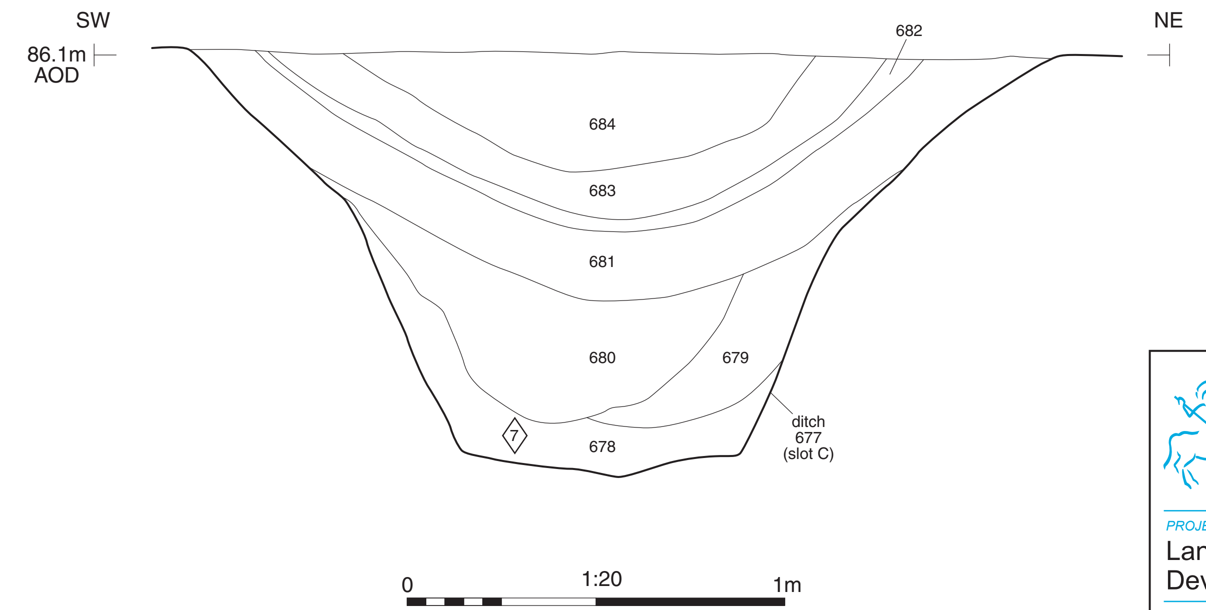
Ditch 645 (slot B), looking south-west (1m scale)

Section EE



Ditch 677 (slot C), looking north-west (1m scale)

Section FF



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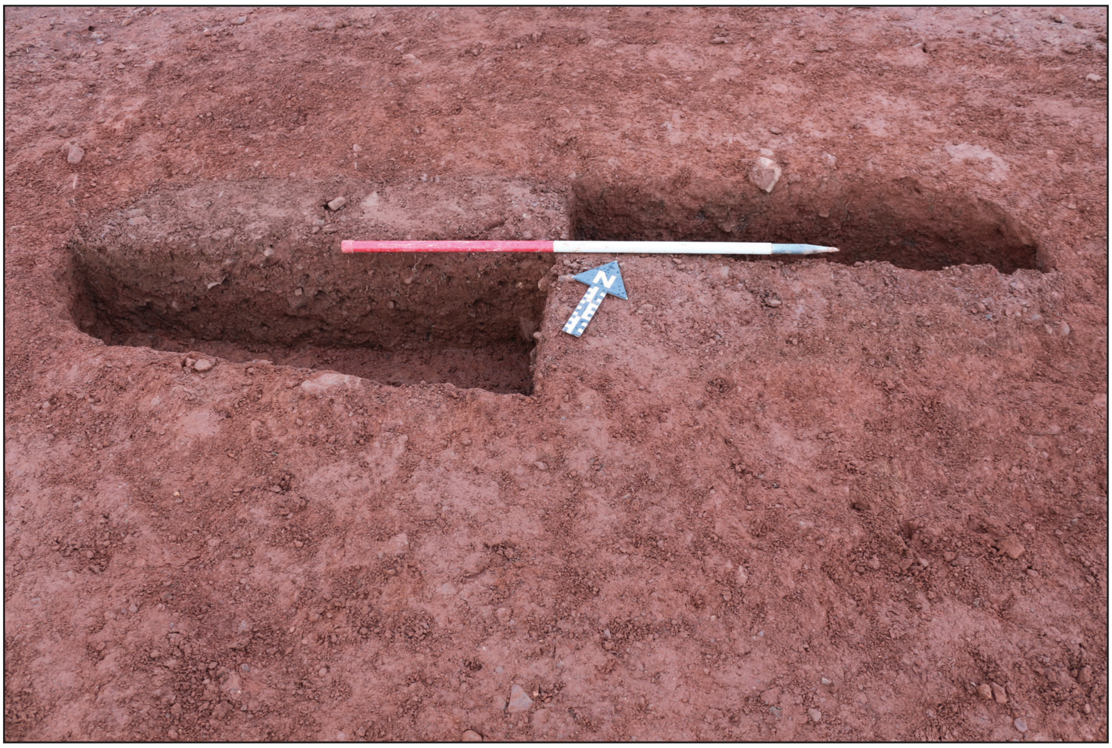
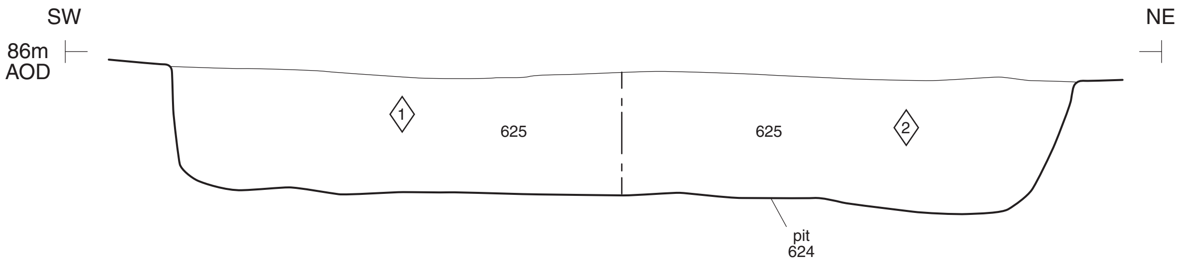


Pit 624, looking north-west (1m scale)

Section GG



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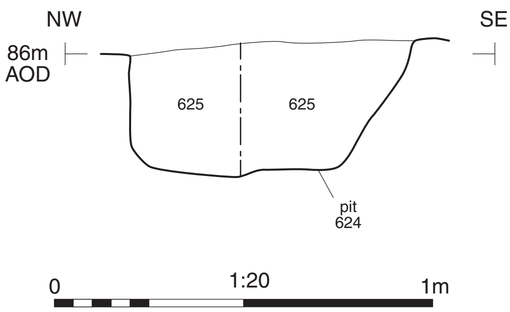

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FIGURE TITLE
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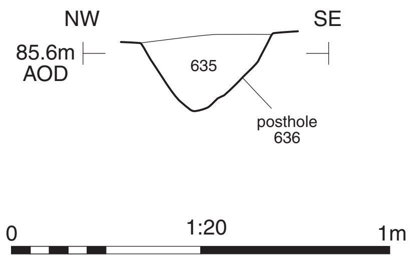
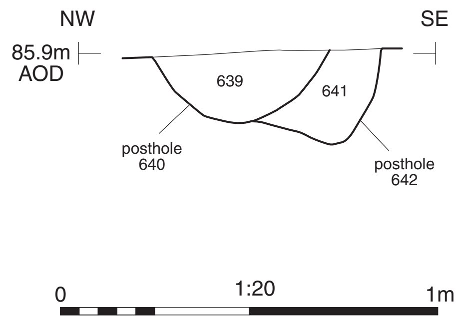
Posthole 636, looking north-east (0.3m scale)

Section II



Postholes 640 and 642, looking north-west (0.4m scale)

Section JJ



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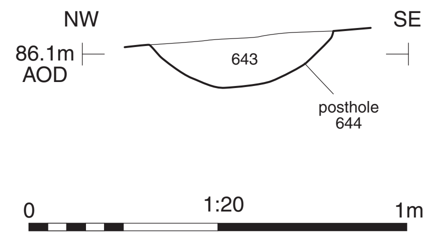
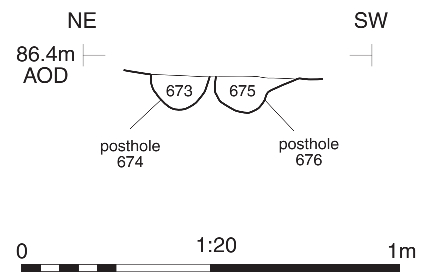
Posthole 644, looking north-east (0.3m scale)

Section KK



Postholes 674 and 676, looking south-east (0.3m scale)

Section LL



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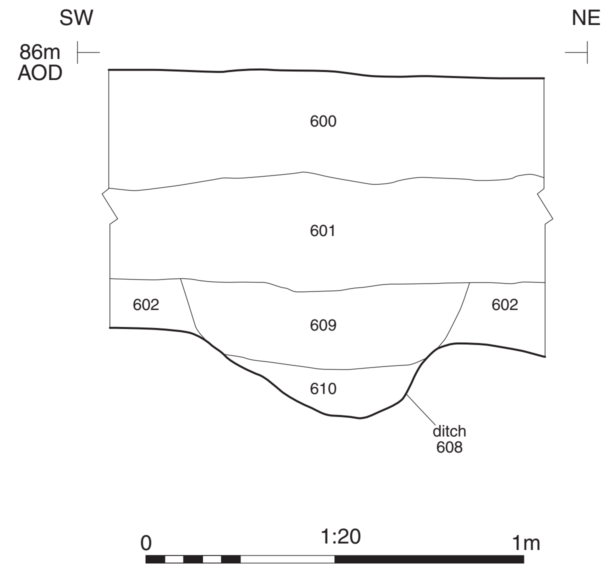
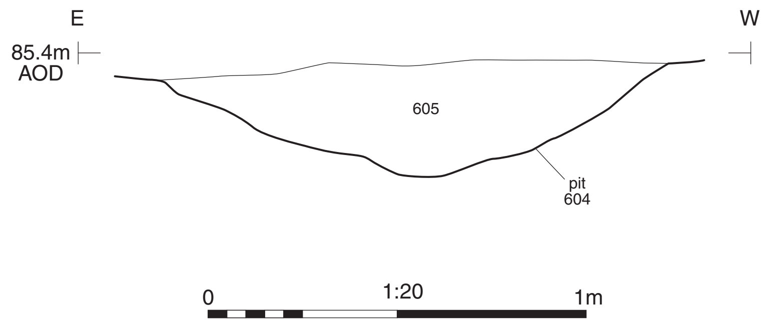
Ditch 608, looking north (1m scale)

Section MM



Pit 604, looking south (0.5m scale)

Section NN



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Land off Uplowman Road, Tiverton, Devon

FIGURE TITLE

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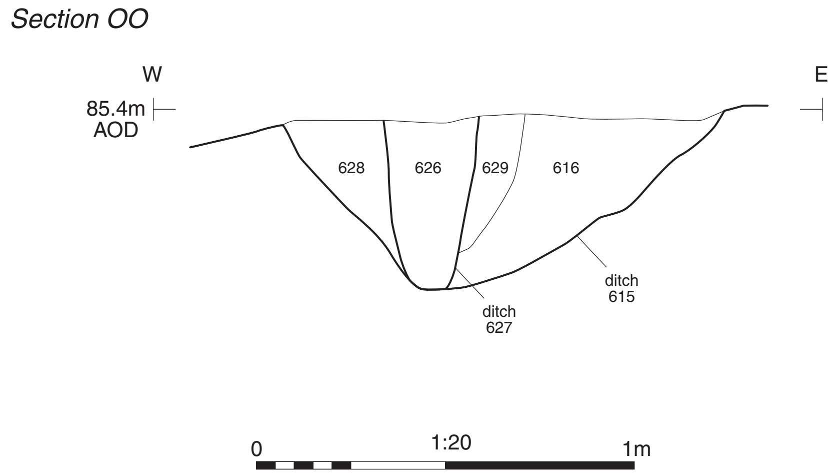
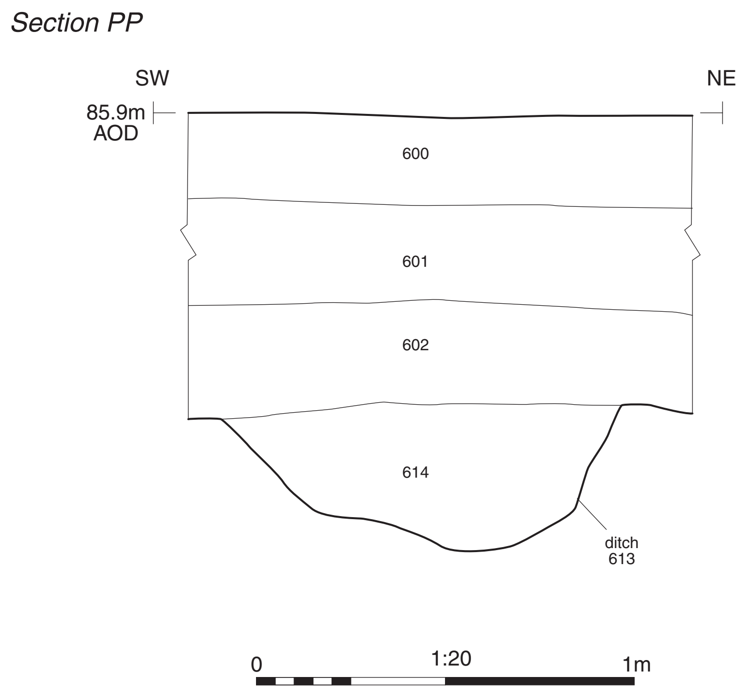
APPROVED BY	**DE**	*SCALE@A3*	**1:20**	

Terminus of ditches 615 and 627, looking north (1m scale)



Ditch 613, looking north-west (1m scale)



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PROJECT TITLE
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FIGURE TITLE
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FIGURE NO.
12

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