UBED13

Archaeological Investigation, Recording, Assessment, Analysis, Publication and Archiving at Fairview House, University of Bedfordshire, Park Street, Luton (Phase 3 - Library and Learning Resources Centre)

Updated Project Design and Assessment of Results

Client: University of Bedfordshire

27/04/15

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UNIVERSITY OF BEDFORSHIRE, PARK STREET LUTON

Client	University of Bedfordshire
Clients Project Manager	AECOM
Demolition Contractor	DSM
Construction Contractor	Willmott-Dixon
National Grid Reference	TL 0953 2103
Address	University of Bedfordshire, Park Square, Campus, Park Street, Luton
Parish:	Luton
Council	Luton Borough Council
Accession Number	2011:64
Planning Application No	13/00285/FUL
OASIS No	headland4-162836
NMR No	
HER No	HER 185
HB/SAM No	
Listing Category	
Project Manager	Joe Abrams
Main text	Jake Streatfeild-James, Joe Abrams
Illustrations	Jake Streatfeild-James, Anna Sztromwasser
Fieldwork	Anthony Clifton-Jones, Michelle Collings, Julian Newman, Emma Jeffrey, Jake Streatfeild-James
Finds Assessment	Julie Franklin (non-ceramic artefacts and management of the specialist team), Paul Blinkhorn (pottery and CBM), Quita Mould (textiles) and Mark Samuels (Masonry)
Environmental Assessment	Damian Goodburn (wood), Tim Holden and Laura Bailey (animal bone, charred plant remains, waterlogged plant remains and charcoal)
Fieldwork	Intermittently between December 2013 to August 2014

Between December 2013 and August 2014, Headland Archaeology undertook a programme of archaeological monitoring, investigation and recording at Park Square Campus, University of Bedfordshire, Luton. Planning permission had been granted for a new library on a site opposite Park Street, the construction of which required the demolition of Fairview House. Archaeological monitoring on the removal of the foundations was required by Luton Borough Council (LPA), which is advised on archaeological planning matters by the Central Bedfordshire Archaeology Officer (AO).

The remains of Fulk de Breaute's castle had previously been identified at this location. The evidence had been gathered by previous excavations to the NW and SE (Illus 2). With this evidence in mind the AO advised that a programme of archaeological mitigation would be required if significant remains were encountered during monitoring, as a condition of planning permission.

Headland Archaeology was procured by Fisher German on behalf of The University of Bedfordshire to undertake this programme of work. A Written Scheme of Investigation (WSI) was prepared (Headland Archaeology 2013), in accordance with a brief from the AO which specified the work that would be undertaken to fulfil the condition.

Excavation of the site revealed further evidence of Fulk de Breaute's castle. This comprised a section of the moat, which showed a sequence of initial excavation, followed by accumulation of occupation material relating to Fulk's Castle, followed by demolition material relating to Fulk's abandonment of the Castle. We interpret these physical remains as the manifestation of a recorded historical event – the destruction of Fulk's castle in 1224. The demolition is followed by the construction of a timber trestle bridge, affording access to the interior of the castle complex. A phase of re-cutting follows the demolition of the trestle bridge, after which a dead hedge designed to stop animal and human access to the moat was inserted. Ultimately, the moat became in-filled, un-maintained and was abandoned and levelled.

A regionally significant assemblage of structural timbers and structural masonry were recovered, both show clear evidence of Anglo-Norman design as would be expected in Fulk's Castle. Datable material was recovered from the entire stratigraphic sequence.

On the town side (exterior of the moat) a series of post-Medieval chalk extraction features and ditches were recorded, while to the north (interior of the castle complex) a ditch was recorded running south-east to north-west, alongside a potential remnant of a rammed clay surface. The site was overlain by a relatively deep, and protective (for the archaeology) layer of soil. This was truncated in parts by the remains of a 19th century terrace which occupied the plot up-to the 1970's. Fairview House was constructed over the demolished remains of the Victorian terrace.

This document presents an assessment of the archaeological remains revealed during the investigations, the data from which have the potential to address a number of national and regional research agendas. The document also contains proposals for further analysis and publication of the data, and the methodologies and resources required to complete the project. The end product will be the publication of the results in the county journal *Bedfordshire Archaeology* and the deposition of the project archive (Accession Number **LUTMN 2011:64**) with Luton Museum.

Contents

1. INTRODUCTION

1.1 Project background

The development of the Phase 3 (Library and Learning Resources Centre) Development Area (DA) forms part of a wider redevelopment of the University of Bedfordshire's Park Square Campus in Luton. Luton Borough Council (LPA) granted the University of Bedfordshire planning permission (13/00285/FUL) for the construction of a new Library at its Park Square Campus. As part of the process of considering that application, the LPA consulted the AO for archaeological advice. The AO advised that the DA was located in an archaeologically sensitive area (see Illus 1) and the applicant must commission a program of archaeological monitoring, investigation and recording in order to gain information on the potential of the site to contain sub-surface heritage assets. An assessment of the impact of the proposed development on identified assets was submitted as part of the planning application for the DA.

Fisher German (on behalf of The University of Bedfordshire) procured Headland Archaeology (UK) Ltd to prepare a written scheme of investigation (Headland Archaeology 2013) and undertake the works associated with it, which comprised a program of archaeological monitoring, investigation and recording. In order to expedite the fieldwork we worked closely with the client (UoB); clients project manager (AECOM); on site demolition (DSM) and construction teams (Willmott-Dixon).

1.2 Site Description and Geology

The DA is located on the corner of Park Street and Vicarage Street, NGR TL 0953 2013. Demolition work took place in November/December 2013 which removed a former Administration Building (Fairview House) from the site.

The geology comprised Holywell Nodular Chalk formation and New Pit Chalk Formation which is overlain with superficial deposits of Glacio-fluvial material represented by clay and areas of sand and gravel.

1.3 Archaeological Background

A search of Central Bedfordshire Historic Environment Record (HER) was undertaken and all recent investigation reports were obtained and reviewed. The majority of the HER records related to post-Medieval buildings, which were not directly affected by the proposals and had no direct significance for below ground remains on the site. HER records of significance included Roman remains (HER10599) revealed during excavations on Vicarage Street (to the immediate SE) and a variety of other remains dating to the Medieval and post-Medieval periods. The DA lies within the historic (Medieval) core of Luton (HER16933), forming part of its eastern end and it also lies *c.*400m NE of the 12th Century castle of Robert de Waudari.

The DA is located close to the 12th-century parish Church of St Mary, and within the moated enclosure of the 13th-century castle of Fulk de Breaute. The castle is referred to as Component 8 within the Extensive Urban Survey: Luton Archaeological Assessment (Albion Archaeology 2003). The location of Fulk de Breaute's castle (more so than Robert de Waudari's) apparently continued to play an important role within the political life of the town after the exile of Fulk de Breaute in 1224. At that time, land formerly occupied by the castle was divided with part of it serving as the site of a 13th century 'court house'. The presence of the castle of Fulk de Breaute was confirmed in 2009

(Keir *forthcoming*) during archaeological investigations associated with the Campus Centre Development, Phase 1b development of the University's Park Square Campus (Illus 2). This lies to the immediate west of the DA. During those works a section of the castle moat, measuring 12m wide and 3m deep, was uncovered along with the remains of a large timber-framed building. To the west of the moat, a small post-Medieval cemetery containing the graves of twelve children was also found.

Archaeological mitigation by Headland Archaeology on the site of the former Student Union Building demonstrated the presence of industrial activity within the core of the castle (Woodley & Abrams, *forthcoming*). This activity consisted of several large pits (potentially tanning pits), boundary ditches and fence lines, showing delineations and internal partitioning of the space inside the castle.

Prior to the redevelopment of the St Ann's Road/Vicarage Street area as a college and later university campus, it was the location of 19th-century terraced residential dwellings. The remains of these buildings, some of which had cellars, were revealed during the investigation of the Campus Centre Development.

1.4 Purpose of this Report

This report presents an assessment of the results of all stages of the archaeological investigations. An Updated Project Design is included, listing all the tasks that will be required to analyse, publish and archive the results of the fieldwork. The completion of these tasks will fulfil the criteria stipulated in the WSI (Headland Archaeology 2013), enabling the discharge of the archaeological planning condition by the LPA.

2. ORIGINAL AIMS AND OBJECTIVES OF THE INVESTIGATION

2.1 Introduction

A series of research aims were established in the project-wide WSI (Headland Archaeology 2013). These were necessary to ensure that the investigation was appropriately targeted in accordance with local, regional and national research priorities.

2.2 National Research Frameworks

At a national level, English Heritage's criteria for prioritising archaeological "sites" are evolving. It's funding criteria for rescue projects, as set out in *Exploring our past* (EH 1991), were similar to those it uses to define a "site" as being of schedulable quality. These included period, rarity, group value, survival/condition, fragility/vulnerability and potential. More recently a draft Research Agenda (EH 1997) built upon the earlier criteria, with the aim of developing an approach reflecting 'the greater determination to pursue research themes' and 'wider interests (*e.g.* in landscapes)'. These include goals such as advancing understanding of England's archaeology, supporting the development of national, regional and local research frameworks and promoting public appreciation and enjoyment of archaeology.

Although the Research Agenda was intended for projects seeking English Heritage resources, *i.e.* not those undertaken within the NPPF, its goals and objectives are relevant to the investigations occasioned by this development.

2.3 Regional and County-based Research Agendas

Broad national research priorities have been formalised by English Heritage in *Exploring our Past* (1991), updated in their draft Research Agenda (1997). On a regional level, a resource assessment and research agenda is now available for Bedfordshire (Oake *et al* 2007) and is clearly of relevance to the development area.

The County Archaeologists of East Anglia have published a resource assessment (Glazebrook 1997) and a subsequent research agenda and strategy (Brown and Glazebrook 2000) for the eastern counties. This study covers the adjacent counties of Cambridgeshire and Hertfordshire, rather than specifically Bedfordshire. Nevertheless, topographical and historical similarities (at a regional level) between these counties make the document a useful tool for assessing the significance of the archaeological remains within the development area. Medlycott (2011) sets out relevant future research topics covering medieval urban planning, quarrying and distribution of stone and assessment of carpentry techniques, as well as summarising current understanding of castle sites in the eastern counties of England.

The Archaeology of the East Midlands: An Archaeological Resource Assessment and Research (Cooper 2006) covers the adjacent county of Northamptonshire. As with the


Park Street
Luton
Bedfordshire
0
100km
Site
507000
510000
N
224000
221000
LUTON
historic core
Fulk de Breaute's Castle
site
0
1km

above study of East Anglia, this region also possesses certain historical similarities with Bedfordshire.

2.4 Original Research Objectives

A number of research objectives, both generic and period-specific, were considered relevant to these works. They are set out below.

Objective / Theme	Research Aims/Themes	Source (Published or internally generated by Project Team)
1.	**Objective 1 – Is there evidence of an entrance to the castle and of any stockade/wall?** The extensive Urban Survey for Luton (Albion Archaeology 2003) shows that the castle and the moat lie north of Park Street which is thought to have formed part of the main road through Medieval Luton running parallel with the River Lea with roads heading north to each of the three crossings. It is possible, therefore, that an entrance to the castle may have existed at the southern edge of the castle to exploit the usage of the nearby road. The central location of the DA on the southern part of the moat has the potential therefore to increase our knowledge of this and for the potential of structural evidence relating to or around an entrance such as postholes associated with a wooden stockade/wall.	WSI: Headland Archaeology, July 2013
2.	**Objective 2 – How does the Moat in the DA differ from the sections already excavated?** The moat of the castle has been previously excavated (A section right across it) to the north (Albion Archaeology 2009) and partially to the south-east (Albion Archaeology 2012) and these samples have increased our understanding of its character. The course of the castle moat is shown to putatively pass through the middle of the DA. This should present the potential to assess and compare environmental potential and structural differences between those sections already investigated and the new (potential) section within the DA.	WSI: Headland Archaeology, July 2013
3.	**Objective 3 – Do remains of a Medieval road and other activity survive outside of the castle?** The DA occupies an area that takes in both the interior and exterior of the castle. The exterior section of the DA would potentially have taken in the Medieval route-way to the south of the castle which lies in the historic core of Luton. The DA has potential to reveal evidence of the Medieval road itself but also additional occupational deposits that may relate to Medieval life in Luton outside the castle.	WSI: Headland Archaeology, July 2013

Objective / Theme	Research Aims/Themes	Source (Published or internally generated by Project Team)
4.	**Objective 4 – What was the nature of the castle?** Since the completion of archaeological works on the Campus Centre Development, our knowledge of the castle has increased Abrams & Woodley (forthcoming) and Keir (forthcoming). The large moat demarcating the site of the castle (also referred to in contemporary documents) and structural remains datable to the period in which the castle was in use have been recorded. The portion of the castle site within which the Campus Centre Development is located, is now well understood. However, the remainder of the castle site, where remains have survived, has the potential to provide more information on the layout, period of use, function/s and building types within the castle.	WSI: Headland Archaeology, July 2013
5.	**Objective 5 – What role does topography play in the way in which land within the castle was used?** If archaeological remains are found within the DA, then the level at which they occur can be reviewed along with levels taken in other investigations. We may be able to pick up differences in the way land was according to its relative height. This may explain why certain activities were located in certain areas on the DA.	WSI: Headland Archaeology, July 2013
6.	**Objective 6 - Do physical remains at the DA bring an understanding of how the castle changed use after 1223?** In 1223 King Henry ordered the surrender of all royal castles (Austin 1928, 98). De Breaute surrendered the site and was exiled. Was the site cleared at that time? Were buildings re-used for other purposes? Physical remains within the DA have the potential to increase knowledge in these areas.	WSI: Headland Archaeology, July 2013
7.	**Objective 7 – How does the occupation/use of the site develop during the medieval/post-Medieval periods?** The forthcoming investigation may also reveal remains datable to the Medieval and/or post-Medieval period. Therefore, the DA may reveal useful, and rare, information on land use in this part of Luton during those periods. Such information has value in its own right and in the sense that it may shed light on how the castle site was split up and to which uses the land was put once its function changed.	WSI: Headland Archaeology, July 2013

Objective / Theme	Research Aims/Themes	Source (Published or internally generated by Project Team)
8.	**Objective 8 – What can the DA tells us about the development of Luton as a Medieval and post-Medieval town?** Oake (et al 2007, 14) refers to a general lack of knowledge on the development of Bedfordshire's small towns and identifies the need to increase knowledge as an important area of study. Ayers (1997, 61) states that each town should be regarded as a single, exceptionally complex 'site' with the potential for increasing our understanding of urban communities. Any excavation, located in the historic core of Luton, such as this, has the potential to increase our knowledge in this area in important ways.	WSI: Headland Archaeology, July 2013
9.	**Objective 9 - How can comparison between Robert de Waudari's and Fulk de Breaute's castles increase our understanding of both sites?** Excavations at Robert de Waudari's castle (Abrams and Shotliff 2010) were considered unusual in that they represented an opportunity to use modern archaeological techniques on a historic site in Luton. Comparison with the results of work on that castle and that of Fulk de Breaute, may allow greater understanding of the differing functions of these two sites. The former being short-term and purely military in nature, the latter appearing to have multiple (legal, military) functions. The latter appears to have had a longer term effect on the town than the former (a legal function being retained at the site long after its castle function was lost). Further consideration of the differences and similarities between these sites may increase our understanding of both sites.	WSI: Headland Archaeology, July 2013

Table 1: Summary of original research objectives and themes

3. PROVISIONAL SUMMARY OF RESULTS

3.1 Methodological approach to assessing contextual data

The contextual data were rapidly assessed in order to establish whether they would provide a coherent spatial and chronological framework. A total of 88 contexts were assigned to provisional Assessment Groups, *e.g.* boundary ditch, post-holes, bedding trenches, *etc*. (Table 2). The allocation of individual contexts to specific sub-groups of contexts was made on the basis of the following criteria:

- Do the contexts form a coherent spatial unit *e.g.* ditch length, pit group *etc.*?
- Do the contexts represent key positions within the stratigraphic sequence?
- Do the contexts contain suitable dating material?

Fills and cuts were then assigned to sub-groups (e.g. primary fills of pit in the Industrial pits or Cuts of pits within the Industrial pits) and sub-groups were then assigned to a number of distinct Groups (e.g. Industrial pits), corresponding to larger coherent and contemporaneous spatial units. These Groups were then assigned to a number of Phases of human activity corresponding to broad, chronological periods, *e.g.* Phase 1 creation of boundaries and Industrial activity area of the Medieval Period. This phasing was based on their artefactual assemblage, character and stratigraphic position.

Period – Medieval (AD1066 – AD1500)	
Phase 1 (Creation of boundaries and Industrial activity area)	
Group – 5: Industrial Pits *(This document is generally structured at this level of the hierarchy)*	
Sub-Group – construction and primary fill of industrial pits or final fill of industrial pits.	
Fill (049), Fill (048) of pit [047]	Cut of posthole [047]

The text which follows is structured by chronological period, and discussed by Group, and, where relevant for detail (by context and/or sub-group); where relevant for making broad interpretations, the discussion utilises Phase and Period groupings.

Period	Phase	Group	Description	No. of features	No. of Contexts	Contexts	Spot Dated Material	Major Event in Castle Biography
Neolithic	1	1	Early stage cores recovered from Pits of unknown (likely Post- Medieval) date	1	2		Early stage Neolithic cores	
Early 13th century	2	1	Cutting of Moat to define castle complex of Fulk de Breaute's (Fulk's) Castle. [1082] represents potential structural modifications to the base of the moat. [1048]=[1032]	2	4	[1032] [1048] [1082] (1083)		Construction of castle complex
Early 13th century		2	Dark organic material is deposited upon the interior side of the base of the Moat. This organic material contains a beech log, which may represent a displaced pile. This is the only fragment of timber which can be (stratigraphically) related to Fulk's bridge. Artefacts and ecofacts from this phase relate to Fulk's tenure over the castle and for that reason are particularly useful.	0	2	(1064) (1065)	Contemporary with Castle Occupation: Herts Grey-ware - M/L12th-M14th; Turnshoe Sole 13th; Copper Alloy Pin, L11th-M/L12th	Occupation of castle complex as a military site

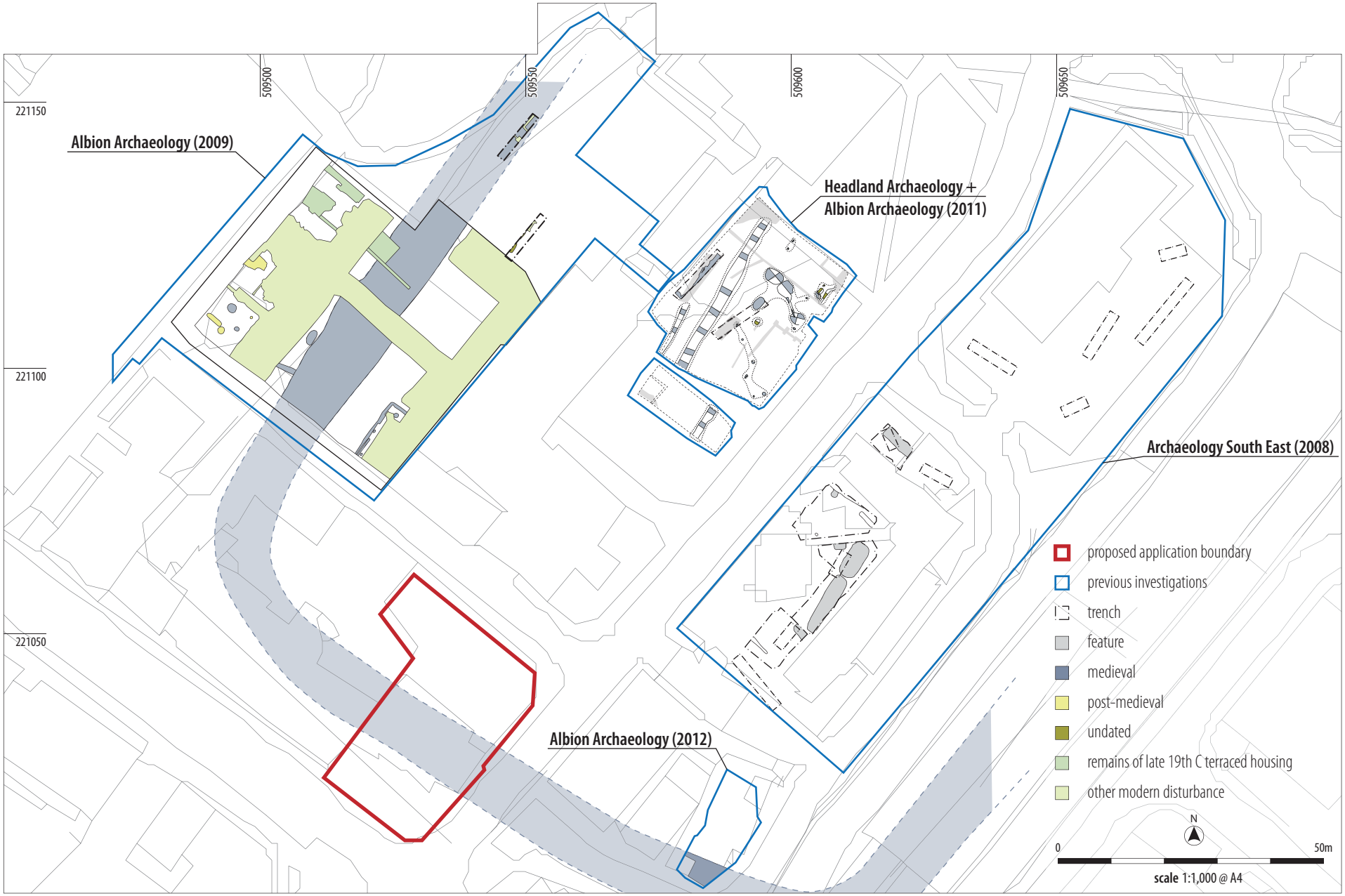
Period	Phase	Group	Description	No. of features	No. of Contexts	Contexts	Spot Dated Material	Major Event in Castle Biography
Early 13th century	3	1	Demolition of Fulk's Castle. This evidenced by the incorporation of large structural masonry in the lower fills of the Moat.	0	2	(1080) (1081)	Historical Date for Castle Demolition - masonry fragments consistent with 12th/ E13th century date	Demolition of castle complex, removing the site's military function - tip lines originating from inside the castle complex
Early 13th century	4	1	Construction of trestle bridge replacing Fulk's' bridge. The trestle beam of the bridge is placed on the deposit of made ground and demolition material, providing a stable foundation for the bridge superstructure.	1	2	[1031] [1068]	Woodworking techniques from timber [1031] consistent with early 13th century woodworking techniques	Construction of entrance for de-militarised castle complex, which now functions as an administrative centre
13th/14th century	5	1	Demolition of the trestle bridge resulting in the abandonment of the trestle beam, and the associated timber fragments [1066], [1067] and [1069]. Slump of material (1079) covering the trestle beam and sealing it - a result of bank collapse on the inside edge of the moat.	0	4	(1079) [1066] [1067] [1069]	Re-cut by [1075] see below:	Removal of second bridge, perhaps due to structure becoming unsound. The bridge was not replaced at this location

Period	Phase	Group	Description	No. of features	No. of Contexts	Contexts	Spot Dated Material	Major Event in Castle Biography
		2	Re-cutting of Moat in order to remove demolition deposits and associated obstacles and to improve water flow. This is the period of use of the Castle complex post the destruction of the Castle and exile of Fulk. Artefacts and ecofacts from these deposits are particularly useful for that reason	1	1	[1075]		
		3	Silting up and deposition of occupational material	0	2	(1076) (1077)		
15th century	6	1	Construction of dead hedge revetment to limit access to the base of the moat. The moat had ceased to function as a watercourse by this time	1	20	[1033] [1039]-[1047] [1058]-[1063] [1070]-[1074]		Construction of dead hedge in the base of the moat
		2	Silting and deposition of occupational material around and over the dead hedge	0	3	(1034) (1035) (1078)	Herts Grey-ware M/L12th-M14th; Surrey White-ware, M13th-15th; Moors' Head Jetton, 15th;	Tip lines from the outer edge of the moat, suggesting settlement on the street frontage…

Period	Phase	Group	Description	No. of features	No. of Contexts	Contexts	Spot Dated Material	Major Event in Castle Biography
Medieval	7	1	Clay surface and use/abandonment of ditch inside the castle complex	2	3	[1084] [1085] (1086)		Activity inside the former castle complex - not stratigraphically related to the moat
Medieval	8	1	Accumulation of dark soil over the interior of the former castle complex marking the site's abandonment	0	1	(1087)	Consistent with observations on BULC	Final abandonment of the castle complex
Post Medieval	9	1	Upper fills of the moat, the top of which is still visible as a low linear depression	0	4	(1038) (1003) (1049) (1050)		
		2	Large post-Medieval pit, subsidiary pitting and drainage excavated into the outer edge of the moat, backfilled with Post-Medieval ceramics. The moat is cut through by features in this phase. Ordnance Survey maps suggest that this area of the site is open ground adjacent to housing and a brewery.	7	16	[1004] (1005) [1006] (1007) [1008] (1009) [1015] (1016) [1017] (1018) (1030)		

Period	Phase	Group	Description	No. of features	No. of Contexts	Contexts	Spot Dated Material	Major Event in Castle Biography
Modern	10	1	Construction of late 19th century housing representing the growth of Luton in the Industrial period. Clearly, this growth is of interest in relation to the hatting industry located nearby the site.	5	12	(1000) (1001) (1021) (1022) (1023) (1024) (1025) (1026) (1027) (1051) (1052) (1053)		
Natural Features					9			
				Total Number of Contexts	88			

Table 2: Summary of provisional phasing



ILLUS 2

Site location – in relation to previous phases of work

HEADLAND ARCHAEOLOGY
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Bedfordshire MK45 4HS
01525 861 578
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509520 509540 509560

221060

221035

221030

221040

221020

509530 509535

1031 bridge structure

1033 dead hedge

1032 moat

1084 ditch

1086 clay surface

INSET

1008

1017 gully

1004 pit

1006 pit

1 2 3 4 5

Levels

1	101.870m AOD
2	103.332m AOD
3	104.170m AOD
4	105.340m AOD
5	105.296m AOD

KEY

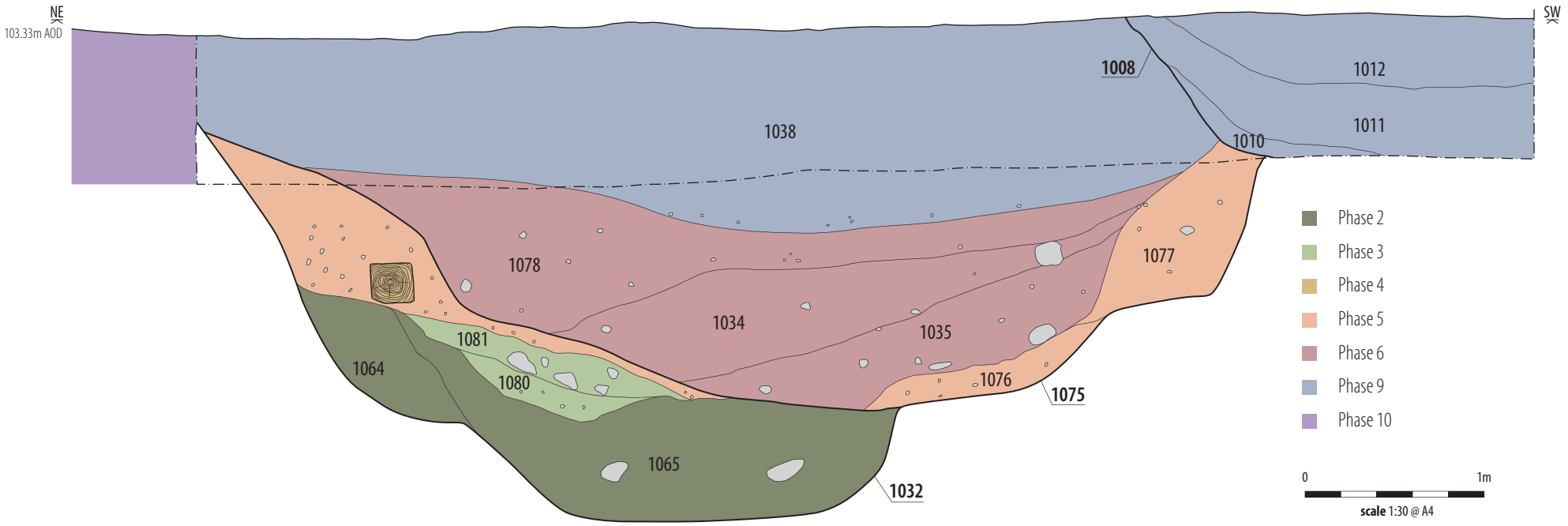
- development boundary
- limit of excavation
- archaeological features
- timber
- predicted alignment of moat
- 19th/20th century truncation

N

0 10m

scale 1:200 @ A3

ILLUS 3
Site plan as excavated



ILLUS 4
NW facing section through moat [1032]

3.2 Structural Illustrations

A series of illustrations are enclosed which break the remains up by Period and Group (Illus 3 - 4). It is often the case that elements of remains from one period (e.g. Medieval ditches) are present in later periods (e.g. post-Medieval). By showing remains from several periods together, it allows the reader to appreciate the effect that later features may have had on 'earlier' landscapes. This system allows for reflection on the above phasing and consideration of alternative approaches.

3.3 Summary of Contextual data results

Phase 1

Prehistoric lithics were recovered from a single context from Phase 6 G2 and two contexts belonging to Phase 9 G2 (see 4.4.9). Items included a possible keeled core and a number of flakes placing the assemblage towards the later Neolithic; a more precise date could not be attributed. Several early-stage cores were recovered from deposits within Phase 9 G2, all of which appeared to be of the same parent material as the naturally occurring flint gravel found on-site.

None of the Prehistoric lithics recovered from the site could be said to originate in secure Prehistoric contexts. The Prehistoric lithics in Phase 6 G2 were recovered from material which also contained a 15th century jetton, confirming they are re-deposited from another source. The Phase 9 G2 features were a series of steep sided pits, which were subsequently backfilled with a mix of post-Medieval ceramics and ceramic building material (see 4.4.12). The phase inclusion within a Post-Medieval matrix might suggest that the Phase 9 pit digging disturbed a series of Prehistoric features in the immediate area, some of which may have been associated with flint extraction.

Period: Medieval (AD1066-AD1500)

Phase 2

G1

Phase 2 G1 consists of a large linear-cut feature [1032] (Illus 3, 4) which was first observed after the removal of the foundations belonging to Fairview House (Illus 3). The cut ran from the north-west edge of the DA to the south east edge, with 11.00 metres of its total length exposed for investigation. Where it was exposed the cut was approximately 10.00 metres wide, although this may have been a reduction of its original width, due to the reduction of the ground level and subsequent truncation during the construction of Fairview House. The maximum depth of the feature was 2.31 metres, (Illus 3) cutting through a layer of flint-rich sands and gravels, into the solid underlying geology which was, in this case, chalk. Levels recorded using differential GNSS equipment showed that the base of the cut was around 101.87m AOD. The profile of the cut was irregular, with the gradually sloping sides becoming more pronounced and steeper at the base.

The deposits within cut [1032] make up phases 2G2-6G2 and 9G1, they will be discussed below. A small cut feature [1082] was recorded in the south-east facing

section through [1032]. This feature had a single fill [1083], and was interpreted as an alteration to the base of [1032].

The scale and alignment of feature [1032] immediately suggests that it represents a continuation of the Fulk de Breaute's early 13th century Moat (Fulk's Moat), a feature which was first observed during excavations to the North of the current site. The moat dates to the construction of Fulk's Castle at some point between 1216 and 1221 AD. Investigation of the moat by Albion Archaeology in 2009 (Keir, Forthcoming) demonstrated that it was around 10.5 metres wide and three metres deep, proportions which are similar to those encountered during this project, demonstrating that the moat was a uniform construction all along its circuit. Fulk's Moat contained a series of well-stratified deposits beginning in the early 13th century, immediately after the construction of the castle, with the final layers of silting being cut by post-Medieval activity (Phase 9 G2). This stratigraphic sequence is illustrated with references to historical events in Table 2.

G2

Phase 2 G2 consists of the primary and secondary deposits within the cut of Fulk's Moat (Illus 4). The primary fill of the moat (1064) was situated on the inside edge of the moat adjacent to the castle complex, with a maximum depth of 0.70m. The Secondary deposit (1065) filled up the base of the moat cut. This deposit appears to have been localised to the South-Eastern side of the excavation area, thinning out to the North and West. The maximum depth of the deposit was 1.20 metres.

Context (1064) was a very compact deposit of light-beige chalk, similar, but clearly defined from the natural chalk, and interpreted as an instance of re-deposited natural. (1065) was a dark black brown, organic-rich deposit of friable peaty clay, which was waterlogged upon excavation. Occasional flint nodules were observed within the along with small lenses of sands and silts.

No finds were recovered from (1064), in contrast with (1065) which produced a wide variety of ecofacts and artefacts. Small finds included a copper alloy pin (see 4.4.4), dated stylistically to the late 11th to mid 12th century, Hertfordshire Grey Ware sherds and a leather turnshoe sole (SF 9) which both date to the 12th-13th centuries, A beech log was recovered from (1065) (see 4.5.9) a "cross cut" pattern of axe marks was identified on the surface of this item, which was interpreted as the result of felling, or "bucking" a felled tree. This timber was sampled for dendrochronological dating. A small assemblage of animal bone was also recovered from (1065) (see section 4.7), including sheep mandible and fragments of heavily fragmented long-bone.

Context (1064) represents a modification to the inside edge of the castle moat, most likely a concentration of re-deposited geological deposit. This may have originated in weathering of the original cut of Fulk's Moat, but could also have been placed intentionally, which might account for its compaction. Context (1065) represents an accumulation of organic material, concentrated in a discreet area of the moat, dating to the short period between the construction of Fulk's Castle (1216-1221) and his exile (1224). The morphology of the deposit suggests a likely origin inside the castle, and the nature of the finds within its matrix suggests the disposal of waste material. The balance of probability indicates that (1065) represents an accumulation of midden

material, being disposed of into the "wet" moat, interspersed with fluvial deposits of silt and sand.

The presence of the beech log (see 4.4.9) may hold some significance, as similar beech logs were used as piles to support the base of a mid 13th century bridge and gatehouse, as revealed during excavations in the Tower of London moat (Keevil, 2004: 69). At the Tower, spare timber and off cuts left over from piling were discarded in the base of the moat (ibid, 73).

Phase 3

G1

Phase 3 G1 consists of two deposits of material (1080) and (1081) (Illus 4), (1080) was had a depth of 0.15 metres in the South East facing section reducing to 0.10m in the North West Facing Section. Context (1081) was recorded with varying depths within the cut of Fulk's Moat: 1.10 metres deep in the South East facing section, thinning to 0.10 metres in the North-West facing section. The two deposits form tip-lines originating from the inside of the castle complex, sealing the organic material of Phase 2 G2.

Deposit (1080) consisted of mid grey-brown chalky clay with large flint nodules all of which measured approximately 0.40 x 0.30 x 0.20 metres. (1081) consisted of loose and poorly sorted brown to orange rubble and stone with frequent inclusions of worked stone, and rubble of similar proportions to those found in (1080).

The artefactual assemblage from this phase consisted of nine fragments of Totternhoe Stone; all recovered from deposit (1081) (see 4.4.11). Of the six which were identifiable there were three fragments of ashlar, two weathering stones and a possible quoin, all of which belong to an exterior wall. Fragments of Totternhoe Stone were also recovered during archaeological investigations by Headland Archaeology in 2011, although none were of any interpretive value. A general lack of weathering was noted on all the worked surfaces, while the tool marks and dimensions of the blocks suggested a 12th century date (see 4.4.11) A single skull fragment with horn-core attached was recovered from (1081) (see 4.7.4) suggesting that this deposit of demolition material also included some midden material from the castle complex.

The morphology of the Phase 3 G1 deposits and the presence of faced stone and rubble suggest that they are demolition material resulting from the destruction of a stone structure within the castle complex (see 4.4.11). These blocks appear to share a common source with facing stone from Bedford Castle, which was also under Fulk's control during the early 1220's (Wilkinson, 1979: 261-265). The likelihood is that this demolition phase represents the removal of the castle's military capability and the faced stone originates from a gatehouse or curtain wall. The demolition of structures within the castle is likely to be associated with events which took place between December 1223 and August 1224, during which time Fulk was associated with a failed rebellion against Henry III, culminating in the siege of Bedford Castle and the execution of Fulk's brother who had held out against the king (Carpenter, 2004: 306).

Phase 4

G1

Phase 4 G1 consists of a several structural timbers (Illus 3 inset). The largest timber [1031] measured 4.55 metres in length, with a nearly square cross-section 0.22 metres across. The upper surface of the timber had been abraded and had decayed, but retained two mortice joints and two lap-joints (one heavily abraded) set in from each end (see section 4.5). [1031] had been placed inside the cut of the moat adjacent to the interior of the castle complex. The timber was placed directly on the upper surface of context (1081) and oriented parallel with the cut of Fulk's Moat [1032] north west to south east. A round wood stake [1068] was also recovered adjacent to the North West end of [1031]. [1068] measured roughly 0.43 metres in length and 0.08 metres in diameter.

The woodworking techniques used to fashion timber [1031] are consistent in date with a late 12th to mid 13th century date. The placement of the jointing suggests that [1031] formed part of a wooden trestle bridge, acting as a sill beam, taking the weight of the uprights and bridge deck. The morphology and placement of the jointing, which are not evenly spaced, might suggest that the bridge was constructed from second-hand timber (see 4.5.2).

The remains of the trestle bridge represent a second episode in the use of the castle complex, following the exiling of Fulk, the destruction of the stone elements of the castle, and partial infilling of the moat, which is all associated with during Phase 3. This phase is most likely associated with the years immediately after Fulk's exile in 1224, when a 'court house' was erected within the former castle complex (Austin, 1928: 102). The asymmetry of the joinery may suggest a second-hand timber source, some of which may have been from Fulk's castle itself. The presence of a round wood stake may be associated with the construction of the trestle bridge, which may have required a temporary scaffold during its assembly.

Phase 5
G1

Phase 5 G1 consists of four contexts, three of which are timber fragments, one is a deposit (Illus 3 (inset) and 4). Timber [1066] was recovered near the northern end of [1031] adjacent to one of the mortice joints. This fragment, the end of a large horizontal or vertical timber measured 0.48 x 0.23 x 0.21 metres at its largest extents. A tenon was recorded on the base of [1066] (see 4.5.3) with the possible remained of a locking-peg hole, however, the surface of the timber had decayed to a point where it was no longer possible to ascertain whether the [1066] matched the mortice on the upper surface of [1031].

Timber [1067] was placed at the northern end of timber [1031] on the interior side of the moat cut; measuring 0.32 x 0.25 x 0.09 metres, it had been placed along with two stone blocks, forming a line of stepping stones, making the base of the bridge structure accessible from the castle interior. Timber [1069] was likewise, a short fragment (0.40 x 0.10 x 0.10 metres) split off from a larger beam.

Deposit (1079) was a mid orange white chalk, identified during excavation as possible re-deposited natural. The maximum depth of the deposit was 0.60 metres and it

appeared to have originated from the inside edge of the moat [1032] (Illus 4), The deposit did not contain any datable artefacts but sealed the timbers discussed above.

The distribution of the timber and the nature of the fragments in Phase 5 G1 suggest a second episode of demolition on the site, at some point during the late 13th to 14th centuries. [1067] and [1069] are small fragments which may be from larger parent timbers, while [1066] appears to have been cast back into the moat cut, or discarded there as an off-cut of a larger structural timber, possibly an upright from the trestle bridge. The positioning of [1068] as a stepping stone, along with two stone blocks also suggests the need to access the base of the bridge, perhaps as part of this demolition episode. The slump of natural material (1079) onto the timbers which remained in the base of the moat suggests the degradation of the internal face of the moat following the demolition of the bridge.

G2

G2 consists of a single feature, visible in the North West facing section as a re-cut of the Fulk's Moat [1032] (see Illus 3). This modification of the original moat is 1.89 metres deep and 5.38 metres wide (as recorded in the North West facing section). The profile of the re-cut is shallower and wider than the original. This modification of the original moat cuts a number of deposits from earlier phases, including the organic-rich (1065) from the earliest phase of the Fulk's Castle, and the slumping material from the interior of the Castle complex (1079), which seals the remains of the demolished trestle bridge [1031] (Illus 4).

The purpose of the re-cut may therefore have been to remove excess material from the base of the moat after the demolition of the trestle bridge during the late 13th to 14th centuries. This may have included organic waste resulting from the proximity of the trestle bridge, or elements of the trestle bridge structure itself, both of which may have contributed to choking the moat.

G3

G3 consists of two deposits, (1076) and (1077), both of which formed on the outside edge of the moat re-cut [1075] (Illus 4). (1076) was mid-grey chalky clay with a maximum depth of 0.20 metres. (1077) was made up of similar mid-grey chalky clay, with a frequent inclusions of flint gravel. The appearance of "dirty" natural suggests that the two deposits are the products of erosion following the excavation of the moat re-cut [1075]. [1076] contained a single sherd of Medieval roof tile, which may be analogous to the deposits of 13th-14th century tile recovered from features by Archaeology South East elsewhere in the castle complex (Harward et al, 2010).

Phase 6

G1

Phase 6 G1 consists of twenty one contexts, all of which belong to structure [1033]. Contexts [1038] [1039] [1040] [1041] [1042] [1043] [1044] [1045] [1046] [1047] [1071] [1072] [1073] and [1074] were round wood stakes set vertically into the primary deposit (1076) and the base of the moat re-cut [1075]. The dimensions of these stakes

ranged from 0.43 metres in length and 0.05 metres in diameter, ranging down to 0.025 metres in diameter. These vertical stakes had been driven in a linear arrangement along the outside edge of the moat re-cut. The stakes were arranged in two parallel lines, pegging together a linear arrangement of horizontally laid timbers and lengths of round wood. Contexts [1058] [1059] [1060] [1061] and [1063] had been laid in place, secured between the vertical stakes. Context [1059] was identified as bundle of round wood rods averaging around 0.013 to 0.010 metres in diameter and 0.45 metres in length. Context [1058] was an oak timber measuring 1.53 metres in length with a cross section 0.125 x 0.080 metres across, upon excavation it was found to have been incorporated into structure [1033]. A sample of this timber was recovered for dendrochronological analysis (see 4.5.7).

The arrangement of a double line of stakes and the initial analysis of round wood and timber from structure [1033] suggests that it represents the remains of a "dead hedge" (see 4.5.7). By this point, despite re-cutting in phase 5 G2, the moat had lost around a third of its original depth due to the build-up of deposits. This may have contributed to periodic drying out of the moat, especially during summer droughts, where the dry moat would cease to act as an effective barrier to livestock and scavenging dogs. The presence of a dead hedge in the base of the moat could therefore be an attempt to re-establish the moat as a formal barrier as it ceased to function as a water course.

G2

G2 consists of three deposits which overlie the dead hedge discussed in Phase 6 G1. (1035) was dark grey-black organic-rich peaty clay with frequent inclusions of fragmented flint (Illus 4). The maximum depth of the deposit was 0.80 metres; it was recorded with its highest point towards the South East edge of the moat re-cut [1075]. (1034) was a similar organic-rich dark-grey black silty clay, the maximum depth of this deposit was 0.34 metres, it sealed (1035), both deposits were waterlogged upon excavation. (1078) was a lighter mid brown grey clay deposit with a maximum depth of 0.60 metres. (1078) filled in the entire width of the moat re-cut, sealing (1034) (Illus 4).

The artefact assemblage from (1035) included Hertfordshire Glazedware and Surrey Whiteware fragments. The production of vessels in these two fabrics overlaps during the 13th to 15th centuries (see 4.4.1). A single French jetton (SF 3) was recovered from material which had accumulated around the dead hedge [1033]; this was identified as 15th century in date. Several worked fragments of wood and timber were also recovered from the infill of the dead hedge, including a fragment of radial split beech board (SF 4) and a small fragment of oak originating from a piece of furniture or possibly a vehicle (timber [1062] originally interpreted as part of [1033] see 4.5.10). A leather pattern strap was also recovered from (1035) along with a skull belonging to a horse, fragments of cow mandible, sheep and goat humerus, mandible and skull fragments with horn core attached (see 4.7.4) suggesting that the deposit had contained a wide variety of refuse. (1034) contained a small assemblage of Hertfordshire Greyware jar and bowl rims. No finds were recovered from (1078).

The earlier deposits in this group, (1034) and (1035) are both higher on the South East edge of the moat re-cut, suggesting that they originated (or had been tipped) from outside the castle complex; they are the first deposits in the moat matrix to be oriented

this way, and therefore suggest a changing focus in patterns of activity within the local area. The presence of dark, highly organic midden material deposited into the moat re-cut from outside the castle may suggest that are between the moat and the road became a focus of activity during the 14th/15th centuries. The presence of possible horn working waste in (1035) might suggest that tanning, horn working and other socially unpopular industries might have been located in the vicinity of the former castle complex, in an attempt to avoid polluting the centre of Luton. The inverted dates in the finds assemblage from this phase, with the earlier Hertfordshire Greyware in deposit (1034) sealing the later material in (1035) may represent the management of older midden material in the local area, perhaps as an effort to partially infill the moat, or simply to dispose of waste.

Phase 7

G1

Phase 7 consisted of two features (Illus 2), which were located to the North East of the moat, inside the perimeter of the castle complex. A single cut feature [1084] was investigated and found to run East-West, with moderately sloping sides and a concave base and a maximum depth of 0.68 metres. 7.5 metres of its total length were revealed: its eastern end ran into the excavation baulk, while its western end was truncated by a series of 19th century features including a large brick ash-pit (Phase 10 G1). Adjacent to [1084] there was a deposit of compacted light beige sandy clay with frequent inclusions of charcoal and a maximum depth of 0.07 metres. The two features shared no obvious stratigraphic relationship, however the depth of (1086) appeared to taper towards [1084].

[1084] was filled by a single deposit (1085), a mid grey brown clay with a maximum depth of 0.68 metres. The fill was uniform, with no large inclusions, suggesting intentional backfilling. The appearance instead suggested that it had been allowed to slit up naturally.

The fill (1085) contained a small assemblage of animal bone: sheep mandible and long bone fragments, many of which had been longitudinally split. A single flint artefact was also recovered, and had signs of very rough working along a single edge, a pattern which may indicate that it was used as a strike-a-light (see 4.4.9). Fire making tools such as this are usually associated with the Medievalperiod. No finds were recovered from the clay surface.

The presence of features inside the castle complex ties in well with observations from previous phases of investigation, especially Headland's work inside the castle complex, (Woodley & Abrams, forthcoming), which found that land inside Fulk's Castle had been divided by ditches and fence lines, and included possible industrial areas and areas of beaten clay floor surface. This had been accidentally burned and fired, before being deposited in a pit along with other midden material (Woodley and Abrams, forthcoming). Several pits and large ditches were recorded during works by Archaeology South-East during 2010, all of which were within the perimeter of the castle (Harward et al, 2010). However, those features were interpreted part of the later (1275-1400) occupation of the castle, largely based on the ceramic assemblage. The features from Phase 7 G1 are sealed by a buried soil (Phase 8 G1, see below) which also

sealed the Medievalfeatures excavated by Headland and Archaeology South-East. The finds assemblage and the stratigraphic position of these features therefore suggest that they belong to Fulk's castle, or occupation dating to the late 13th to 14th centuries.

Phase 8

G1

This phase consists of a single deposit (1087) which was removed using a flat bladed machine bucket under constant archaeological supervision. The deposit had been truncated by the foundations of Fairview house, but survived outside the building footprint, in the area to the north and east of the moat [1032]/ [1075]. This deposit was recorded in the North and East excavation baulks, having a maximum depth of 0.42 metres. It was characterised as dark black brown sandy clay, with frequent inclusions of broken brick, the majority of which appeared to be intrusive, originating from a spread of demolition material which sealed (1087).

(1087) is directly comparable to the buried soil recorded by Archaeology South-East and Headland, which is now thought to have completely covered the castle complex, and marks the its abandonment.

Phase 9

G1

Phase 9 G1 consists of four contexts: (1003) (1038) (1049) and (1050), all of which are likely to refer to the same stratigraphic unit, although encountered in different places, with varying levels of truncation (Illus 4). The deposit was mid grey-brown sandy clay, with a maximum depth of 1.02-1.40 metres. Moving down the deposit, the colour changed to a light beige-brown. There were no inclusions of flint gravel or chalk within the matrix of this deposit. Deposits in Phase 9 G1 entirely sealed the lower fills of the moat re-cut, ensuring that the entire sequence remained waterlogged and anaerobic.

The lack of artefacts and ecofacts in these fills suggest that the moat had ceased to be a focus for depositing midden material after the late Medieval period. The latest datable material deposited prior to this phase is the 15th century jetton recovered from (1035) – Phase 6 G2. This would suggest that, from the late 15th -16th centuries onwards the castle complex ceased to be a focus for activity. The homogenous nature of the deposits in Phase 9 G1 suggests that this section of the moat was allowed to silt naturally and the Medieval fills were not removed, as was the case in the area under investigation by Albion Archaeology in 2010 (Keir, forthcoming).

G2

The silting up of the moat carried on for a period of at least 200 years, before the resumption of activity within the immediate area. Phase 9 G2 consists of six features cut around the South Western edge of the ditch (Illus 3). [1004] is the earlier of two intercutting pits, with a single fill (1005) and a maximum depth of 0.36m. This modest pit was cut by [1008], which also cut through the upper fills of the moat re-cut [1075]/(1038) (see Illus 2). [1008] was a large, steep sided feature with a stepped base

apparently cut to two levels. A modification to the base [1006] was visible on the shallow level: forming a posthole or more likely an extraction cut, with a maximum depth of 0.56 metres and a single fill (1007).

[1008] contained a primary fill (1030) of mid orange-grey chalky clay, with a maximum depth of 0.13 metres, covering the base of the stepped cut and sealing (1006), the mid white-orange chalky clay fill of [1007]. Two of the prehistoric lithics from Phase 1 G1 were recovered from (1006). After being left open, [1008] was then backfilled with a single homogenous deposit of light orange brown chalky clay (1009).

(1009) contained an assemblage of late Medieval and early post-Medieval ceramics and ceramic building material, including bricks, floor tiles and roof tiles; although this is likely to have been residual, as it was mixed with white earthenware, slip decorated earthenware and stoneware, along with a tin glazed wall tile. The wide range of material recovered from this fill suggests a composite source, such as communal dump, which may have built up over the course of several centuries.

The size and morphology of [1008] suggests that it was dug with the purpose of extracting the natural chalk and flint which make up the solid underlying geology. The production of lime mortar for stone buildings would certainly have been an essential ingredient for Luton's Post-Medieval growth.

Two features were cut through the upper fills of [1008]: a small gully [1017] and a small pit or posthole [1015] (Illus 3). Both were very shallow and are likely to have suffered truncation during the construction of Fairview house (see Phase 10 G1). [1017] contained a single fill of dark brown-grey silt (1018). [1015] is cut alongside [1017] suggesting a relationship between the two features, possibly as a gully and fence line with [1015] represented a former post-hole.

Phase 10

G1

This phase consists of the final episodes of activity within the development area, bringing the site interpretation up to the present day. Examination of the Ordnance Survey sheets available courtesy of the National Library of Scotland shows that the development area lay open until the construction of Vicarage Street and associated terraces at some point between 1879 and 1899. The late 19th century development caused several concentrated areas of truncation; including a brick-built cesspit cutting into the North Eastern edge of the moat, and a large brick-built ash-pit situated in the Northern corner of the site (Illus 2).

Following the demolition of the Victorian structures, Fairview House was constructed for the University of Bedfordshire. The structure consisted of a ring-beam foundation supported on a number of concrete piles, situated around the corners of the ring-beam and at its centre. The pile array in the centre of the structure had penetrated the lower fills of the moat, narrowly avoiding the dead hedge [1033]. However, the concrete piles had had no appreciable effect on the preservation of the waterlogged material at the base of the ditch.

4. ANALYTICAL POTENTIAL OF THE DATA

4.1 Introduction

For the following discussion, the datasets recovered during the investigations have been divided into three main classes: contextual; artefactual; and ecofactual.

- ***Contextual*** data relate to the identification of individual events such as the digging of a ditch, its primary infilling *etc*. These have been recorded as context records during the evaluation and open area excavation. All contexts have a detailed record sheet; many have a plan and section drawing along with photographs.

- ***Artefactual*** data comprise manmade objects recovered during the open area excavation. These have been divided for ease of discussion into different materials *e.g*. pottery, flint, metal etc. (including registered artefacts and bulk finds, such as industrial residues).

- ***Ecofactual*** data comprise natural materials found within excavated deposits. These are able to yield information on the nature of past human activity and its environmental setting. They include animal bones and information obtained from environmental samples (*e.g.* plant remains).

Contextual data are discussed first in the following sections, as they have provided the framework for the preceding summary of results and the subsequent dataset discussions. The methodological approach taken with each dataset is discussed, followed by sections dealing with quantification, provenance (spatial and chronological) and also condition. All these factors are important in deciding the potential of the material for analysis.

4.2 Contextual Data

Quantity of records

Table 3 presents a breakdown of the total quantity and type of contextual records. These comprise the written description/interpretation of a deposit/feature (context sheets), a map-like drawing showing the location and inter-relationship between features, including digital mapping (a plan), a profile drawing through a feature and its fills (section), and photographs.

Contexts	Plan Sheets	Sections	Photographs
88	4	2	275

Table 3: Quantity records

4.3 Survival and condition of remains encountered

The earliest material on the site comprised worked flint, likely to date to the Neolithic. These finds were relatively unabraded, suggesting they had not been extensively rolled. Even so, it is thought that they are part of a deposit which originated locally, and was

used as backfilling material for a chalk extraction pit at some point during the Post Medieval period. Instead, their interest lies in their existence, albeit in small numbers, at this location, confirming Neolithic activity in the local area.

The majority of the remains identified were early Medieval to post-Medieval in date. These remains comprised of a section of moat (part of the south-western arm of a moat encircling the castle complex). This contained rich artefactual and ecofactual remains. Some were in-situ (like the base of the timber Trestle Bridge) others were there as a result of demolition (structural masonry and timber from the Castle and its bridge). Others were the result of casual discard or loss (animal bone and coinage). The Moat was sealed by layers which confirm its ultimate abandonment and total lack of maintenance in the later Medieval and post-Medieval periods.

Significantly, the stratigraphy of the Moat infill allowed for correlation between the historical record and physical remains. Specifically, it was possible to identify a possible early bridge (via a beech pile) associated with early silting at the base of the Moat; these deposits were sealed by demolition material (large structural blocks, wood and gravel). A large, in-situ trestle beam for a later bridge and other deposits overlay these. We have utilised dating of the carpentry on the timber and the style of the masonry to tie this demolition material to Fulk de Breaute's bridge. There, in the lower layers of the Moat lie parts of his slighted Castle, his exile recorded in rubble remains. Fascinatingly, above that are the stratigraphic layers of later Moat maintenance, bridge building and casual discard of visitors to the town/castle complex.

Parts of the archaeological deposits/features have been affected by the 19th and 20th century development in the area. Ground reduction and levelling has taken place across the site throughout the various developments, but this has generally had little impact due to the levelling activity generally being at its deepest c.0.30m above the Medieval archaeological horizon. Truncations associated with the most recent development of Fairview House and related buildings have had the greatest impact. This included deep foundations consisting of a concrete ring beam, with a central array of piles. Services, sewerage and surface water runoff were also present, all of which truncated deposits down to natural geological layers. The 19th century development of terraced housing on the site had a lesser impact with only two large features having any impact on the archaeological horizon. These included a cylindrical cess pit which had a vaulted brick cover, and the truncated remains of rectangular built brick ash pit. The majority of this stage of development survived as a demolition layer immediately below the current ground level.

The presence of well preserved organic material in the base of the moat would appear to suggest that further investigation of the environmental samples might augment our understanding of Luton as a developing town and the occupation of the former castle during the 13th and 14th centuries.

4.4 Artefactual Data

by Julie Franklin, Paul Blinkhorn, Richard Henry, Julie Lochrie, Quita Mould, Mark Samuels

4.4.1 Introduction

The finds assemblage was relatively small but varied. There were 42 sherds (503g) of pottery, 12 metal finds, a number of ceramic and stone building materials and various other finds of ceramic, clay pipe, glass and flint. The waterlogged conditions in the ditch also preserved some Medieval leather. A summary of the assemblage is given below (Table 1) broken down by phase.

Material \ Phase		1	2	3	4	5	Total
Pottery (Medi)	count	2	-	-	10	-	**12**
	weight	42g	-	-	193g	-	**235g**
Pottery (PM-Mod)	count	-	-	-	-	30	**30**
	weight	-	-	-	-	268g	**268g**
Copper Alloy	count	1 pin	-	-	1 jetton	-	**2**
Lead	count	-	-	-	-	1	**1**
Iron	count	1	-	-	3	5	**9**
Leather	count	4	-	-	2	-	**6**
Ceramic	count	-	-	-	1	-	**1**
Clay Pipe	count	-	-	-	-	2	**2**
Glass	count	-	-	-	-	11	**11**
Lithics	count	7	-	-	33	15	**55**
Industrial Waste	weight	1g	-	-	-	1g	**2g**
Arch Frag	count	-	6	-	-	-	**6**
CBM	count	-	-	1	22	37	**60**
	weight	-	-	136g	1092g	839g	**2067g**
Mortar	weight	16g	-	-	17g	176g	**209g**
Finds Dating		M12th-13th	12th+	Medi	14th-15th	17th-19th	

Table 3 Quantification of finds by phase, with spot dating

4.4.2 Methodology

All the finds materials were examined and recorded by appropriate specialists. The data was then gathered into one MS Access database. A copy of this is given below as a table at the end of the report.

Pottery and ceramic building materials were visually examined and divided into fabric types and quantified by sherd count and weight. Where appropriate these were recorded using local type series.

The leather was identified and catalogued including measurement of relevant dimensions and species identification where possible. No allowance has been made for shrinkage. Leather species were identified by hair follicle pattern using a low-powered magnification. Where the grain surface of the leather was heavily worn identification was not always possible.

Lithics were assessed and summarised by context, noting the colour, condition, type, reduction stage and likely date of the finds

Ten architectural fragments were collected on site, but only six of these were deemed to have interpretative potential. The remainder were not recorded, but have been retained within the site archive.

The assemblages could be compared to finds recovered from earlier excavations

elsewhere on the site of the same castle (Marshall-Woodley 2011; Woodley & Abrams forthcoming).

4.4.3 Pottery (HL3)

The pottery assemblage comprised 42 sherds with a total weight of 503g. All the wares are types which are well-known in the region. They were recorded using the conventions of the Bedfordshire County Archaeology Service type-series (e.g. Baker and Hassall 1977). A summary of the types found is shown below (Table 4).

Fabric Code	Fabric Name	Dating	Sherds	Weight
C16	Surrey Whiteware	mid 13th – 15th C	2	61g
C58	Hertfordshire Glazed ware	13th- 15th C	1	11g
C60	Hertfordshire-type Greyware	mid/late 12th – mid 14th C	9	163g
P01	Glazed Red Earthenware	16th – 18th C	11	76g
P06	Slip-decorated earthenware	17th C	1	122g
P37	White Salt-glazed Stoneware	early-mid 18th C	1	23g
P56	Mass-produced White Earthenware	19th – 20th C	17	47g

Table 4 Pottery fabrics

The assemblage was generally in good condition, with most of the sherds large and unworn, indicating that they are reliably stratified. The Medieval material comprised a mixture of unglazed jars and bowls and glazed jugs, which is typical of sites of the period in the region. The assemblage is probably too small to draw any firm conclusions, but it may be significant that common late Medieval wares (late 14th – 16th century) were entirely absent, suggesting there was little activity at the site by that time.

4.4.4 Metalwork

The metalwork numbered two finds of copper alloy, one of lead and nine of iron. The two most significant were the copper alloy finds. The earliest of these was a small pin (1065, Ph.2 G1). It has a hipped shaft and a decorative and looped head. It has early Medieval parallels at other sites (e.g. Goodall 1982, fig.44:47) and is likely to date to the early Anglo-Norman period (late 11th to mid 12th century). The other find was later, a jetton (1035, Ph.4) likely to be of French origin and probably of 15th century date (Mitchiner 1988).

Medieval iron finds were all of nails. A curving iron band was recovered from a modern context (1009, Ph.9 G2) as was a strip of lead but these are likely to be of recent date.

4.4.5 Leather (HL3)

The leather was found waterlogged in three different contexts within the ditch. It has been stored wet in refrigerated conditions.

The earliest pieces were a sole from a turnshoe and a three unidentifiable fragments (1065, Ph.2 G1). The form of the shoe indicates a Medieval date and is most likely to be 13th century. Two later pieces (1034, 1035, Ph.6 G2) can be identified as straps, one possibly from a patten.

4.4.6 Ceramic (HL3)

One spindle whorl (1035, Ph.6 G2) was made from a sherd of sandy roof tile (fabric TF2, see Ceramic Building Materials) by chipping away the tile around the peg-hole to make a roughly circular shape. It is not uncommon for broken sherds of pottery and tile to be reused in this way during the Medieval period.

4.4.7Clay Pipe (HL3)

Two small sherds of clay pipe stem were recovered from a recent cellar cut or extraction pit (1009, Ph.9 G2), they may date anywhere between the late 16th and early 20th centuries.

4.4.8 Glass (HL3)

From the same recent context (1009, Ph.9 G2), 11 sherds of glass were recovered, six of bottle glass and five window fragments. The bottle glass all derived from green wine bottles. The largest sherds are clearly from straight sided bottles and thus must date to the mid 18th century or later (Dumbrell 1983).

4.4.9 Lithics (HL3)

The flint assemblage numbered 55 pieces, weighing 4.1kg. Typically it was of a brownish-grey colour although slight variations within this occur; also present are blue-grey and yellow/red-brown varieties. Where cortex remains it indicates most of the flint is chalk flint. Chalk flint was present in (1005), (1007) and (1009).

Prehistoric lithics were retrieved from (1005), (1009) and (1035). Not many were indicative of date although a possible keeled core (1009) would point towards the later Neolithic. Flint flakes from (1035) have platforms and shows signs of systematic removals on the dorsal side and are almost certainly residual pieces from prehistoric activity in the vicinity. Prehistoric lithics were also found during previous work undertaken in the area (Marshal-Woodley 2011).

The method of reduction of some early-stage cores on chalk flint nodules indicates probable exploitation of the nearby flint source, potentially made easily accessible by periglacial action.

Some of the flint recovered from ditch deposits (1034, Ph.6 G2) and (1065, Ph.2 G1) shows no indication of prehistoric working. The larger flint cobbles found in (1065, Ph.2 G1) have mortar adhering to them and may in fact have been used as building materials.

Finally, there is an unusual flake (1085, Ph.7 G1) which has a crushed edge where lots of small flakes have been detached. This may be some unsophisticated, irregular later prehistoric retouch or the flake may have been used during the Medieval period as a strike-a-light.

4.4.10 Industrial Waste (HL3)

Magnetic residues were recovered from sample retents in four contexts (1065, 1085, 1086, Ph.2 G1 and 1009, Ph.9 G2). These were all in amounts of 1g or less, with a total weight of 2g. Some of these may relate to ironworking though some are clearly natural magnetic stone chips. It was not found in large enough quantities to imply ironworking was being undertaken on the site.

4.4.11 Architectural Fragments (HL3)

Six architectural fragments (AF) were recorded, all recovered from the same well stratified context of demolition material under timbers [1031] (1081, Ph.3 G1). It is thought that the stones were originally structural elements from the castle deposited in the moat during its demolition after 1224 and reused to support a trestle bridge forming the main access to the later "court house".

All were of Totternhoe stone. Despite its softness and supposed unsuitability for external use, there is no evidence (e.g. plaster) to suggest this stone was employed on anywhere but the exterior of the parent structure. Pieces of the same stone type were found during earlier excavations on the site (Marshall-Woodley 2011, 8), though in that case all were badly weathered and fragmented and of no further interpretative value.

There were three ashlars, two weatherings (sloping stone intended to cast water, usually employed on buttresses or the bases of walls) and a possible quoin. The presence of ashlar and robust weathering components indicate a common 'parent structure'. As there were no mouldings or other forms of ornamentation present, the only dating evidence available was in the form of tool marks. The tooling was always diagonal; whether on the concealed joints or the faces of the blocks. This suggests a 12th century date. There are three occurrences of the dimension 293-5mm which may be suggestive of an early foot measure.

The absence of weathering on all stones (with the exception of SF12) suggests that this building was short-lived. This is supported by the narrow dating gap between the finds and their context.

4.4.12 Ceramic Building Material (HL3)

This assemblage was made up predominantly of roof tile, with 47 sherds (1660g). There were also 11 sherds (267g) of brick, one sherd (57g) of floor tile and one sherd (83g) of wall tile.

The fabric types are shown below (Table 3)

Fabric Code	Fabric Name	Description & Dating	Sherds	Weight
TF1	Anglo-Dutch tin-glazed wall tile	Fine white fabric with white exterior tin-glaze and painted blue monochrome decoration. M/L18th century	1	83g
TF2	Sandy roof tiles	Hard, red sandy fabric with rare calcareous material up to1mm, rare flint up to 10mm. Medieval?	46	1689g
TF3	Calcareous ironstone roof and floor tiles	Slightly sandy with sparse to moderate rounded calcareous material up to 2mm,	3	168g

		rare to sparse sub-angular red ironstone up to 2mm. Medieval?		
BF1	Early sandy brick	Soft, slightly sandy fabric with rare calcareous material and ironstone up to 2mm, sparse angular flint pebbles up to 15mm. Late medieval?	11	267g

Table 5. CBM fabrics

Fabrics TF2 and TF3 are fairly typical of Medieval sites in the region (e.g. Slowikowski 2005). All the fragments of TF2 are unglazed roof tiles, with a few fragments of the former exhibiting peg-holes. Finds were concentrated in Phase 6 G2 deposit (1035), with more sherds presumably residual in Phase 9 G2 deposits (1005, 1009). A single TF2 tile sherd was the only find recovered from Phase 5 G3 deposit (1076), though may in fact be intrusive there.

A single small fragment of decorated Medieval floor tile was noted (1009, Ph.9 G2) in fabric TF3. It was extremely worn, to the extent that it was impossible to ascertain the original design, with just a few traces of slip and green glaze remaining on the upper surface. It is 18mm thick.

The brick was all fragmentary and all of the same fabric (BF1). Two pieces (1009) had a vitrified face. These were often used to form decorative diaper patterns in brick walls of the late Medieval and early post-Medieval periods (e.g. Smith 2004, 260). All were found in Phase 9 G2 deposits (1005, 1009).

The tin-glazed tile is incomplete, but about one-third survives. The main motif is a landscape in a roundel, with an 'ox-head' motif filling in the surviving corner. It is a fairly typical English product of the second half of the 18th century, and probably made in London (Betts and Weinstein 2010, 140).

4.4.13 Mortar (HL3)

Various fragments of lime mortar were recovered, including 16g from early moat deposit (1065) and 17g from later deposit (1034, Ph.6 G2). The majority, 176g, derived from the more recent (1009).

4.4.14 Recommendations (HL3)

There are three parts of the finds assemblage with potential for further study:

- finds associated with the construction and occupation of the castle
- finds associated with late medieval/early post-Medieval activity on site

Castle period

The first group is clearly the most coherent and important in terms of interpreting the remains of the castle, the dating of its construction and occupation. To this end, analysis should concentrate on the architectural fragments, the copper alloy pin, the leather turnshoe, the early pottery and the possible flint strike-a-light. Full reports should be produced on all these finds, citing typological information and referencing comparative finds at other sites.

The copper alloy pin and leather turnshoe should be conserved before illustration and analysis. For the pin, this will reveal additional detail on the pin head. For the leather it may reveal features of construction, decoration and species identification, not visible when the leather is wet. The architectural fragments should be cleaned before any photographic illustration work is carried out.

The copper alloy pin and leather turnshoe should be illustrated. Tooling on the architectural fragments should be photographed and diagrammatic publication drawings of the most important elements should be produced by a specialist. The flint strike-a-light and a jar and bowl rim of Herts Greyware pottery are also recommended for illustration.

Late medieval/early post-medieval
This period is less well defined but includes some interesting finds such as the jetton, the leather patten strap, and floor and roof tiles. The potential of these finds is limited, but if this period is discussed, and then a short report on the finds and the evidence they provide for both the dating and character of the activity post-dating the castle. Allowance should be made for the illustration of a few finds to accompany this. The jetton and the patten strap are of particular interest. A selection of pottery and ceramic building material could also be shown.

Archiving
The material should all be packaged and archived in accordance with guidelines produced by Luton Culture (2013).

The architectural fragments should be repackaged, where possible being placed in boxes. Newspaper (rather than e.g. bubble wrap) should be used as a packing/padding material to allow 'breathing'. If too large to package, stones should be permanently marked and labels should be attached with polyester parcel string.

The leather cannot be stored wet indefinitely. Without conservation the leather will deteriorate and is potentially hazardous to health being liable to fungal and bacterial infection. Luton Culture should be consulted as regards these finds (Luton Culture 2013, section 4.4) and it is likely that it will require stabilisation. English Heritage Guidelines (2012) provides advice on the conservation options available. It may be that for such a small group of robust material air-dying under controlled conditions is the most cost-effective option.

4.4.15 Finds Catalogue (Table 6)

Phase	Context	SF	Sample	Qty	Wgt (g)	Material	Object	Fabric Code	Description	Spot Date
9	1005			1	113	CBM	Brick	BF1	Early Sandy fabric	L Medi
9	1005			1	66	CBM	Roof Tile	TF2	Sandy fabric	Medi
9	1005			2	22	Lithics	Flint		edge retouched inner flake and short, thick, secondary flake. The edge retouched flake has a broken distal edge but the retouch can be seen at either distal corner of the break, it is abrupt in	PH

Phase	Context	SF	Sample	Qty	Wgt (g)	Material	Object	Fabric Code	Description	Spot Date
									character and was likely a scraper	
9	1007		1001	2	280	Lithics	Flint		early-stage cores	PH
9	1009		1002	10	154	CBM	Brick	BF1	Early Sandy fabric, Vitrified face	L Medi
9	1009			1	83	CBM	Wall Tile	TF1	Tin-glazed Tile, Wall tile	M/L18th
9	1009			2	56	CBM	Roof Tile	TF2	Sandy fabric	Medi
9	1009		1002	20	281	CBM	Roof Tile	TF2	Sandy fabric	Medi
9	1009		1002	1	29	CBM	Roof Tile	TF3	Calcareous Ironstone fabric	Medi
9	1009		1002	1	57	CBM	Floor tile	TF3	Calcareous Ironstone fabric. Decorated floor tile	Medi
9	1009		1002	2	3	Clay Pipe	Stems		small pieces, plain	L16th-E20th
9	1009		1002	3	4	Glass	Bottle		green sherds	18th/19th
9	1009			3	64	Glass	Bottle		green wine bottle sherd, laminating, from straight-sided bottle	M18th-19th
9	1009		1002	5	2	Glass	Window		small greenish sherds	PM
9	1009		1002		1	Industrial Waste	Magnetic Residue			
9	1009		1002	1	15	Iron	Strip		curving strip, narrowing at each end	
9	1009		1002	4	12	Iron	Nails		small nails	
9	1009		1002	1	2	Lead	Strip		small strip, folded	
9	1009			1	619	Lithics	Flint		hinge-terminated, secondary flake	?PH
9	1009		1002	10	738	Lithics	Flint		two flakes, early-stage cores, platform core (possible keeled?) and possible edge retouch	PH
9	1009		1002	12	176	Mortar	Lime Mortar		lumps	
9	1009			5	40	Pottery (Mod)	White Earthenware	P56		19th-20th
9	1009		1002	12	7	Pottery (Mod)	White Earthenware	P56		19th-20th
9	1009		1002	9	20	Pottery (PM)	Glazed Red Earthenware	P01		16th-18th
9	1009			2	56	Pottery (PM)	Glazed Red Earthenware	P01		16th-18th
9	1009			1	122	Pottery (PM)	Slip-Decorated Earthenware	P06	Bowl	17th
9	1009			1	23	Pottery (PM)	White Stoneware	P37		E/M18th
6	1034	8		1		Leather	Leather strap, folded and stitched		Strap folded along its length on each side to form a double thickness and joined with a butted seam with whip	

Phase	Context	SF	Sample	Qty	Wgt (g)	Material	Object	Fabric Code	Description	Spot Date
									stitching, stitch length 5-7mm, down the centre back. A double row of small, paired grain/flesh stitching runs parallel to each of the folded sides, passing through both thicknesses of leather, so that both faces have four rows of horizontal, parallel stitching, roughly evenly spaced, running down their length. Thread impression is visible on the grain side of both faces. A small D-shaped hole, c.7x6mm, has been punched through both layers on the left side close to the edge. Was folded in half when recovered. Leather goatskin c. 1.5mm thick, grain surface worn in places. Strap is incomplete being torn away at each end. Surviving length 244+mm, width 48mm, combined thickness (two layers) c. 3.61mm.	
6	1034		1009	2	700	Lithics	Flint		large and small chunk	Medi?
6	1034		1009	1	17	Mortar	Lime Mortar		lump	
6	1034			7	121	Pottery (Medi)	Herts Greyware	C60	jar and bowl rims	M/L12th-M14th
6	1035			21	1010	CBM	Roof Tile	TF2	Sandy fabric, flat roof tiles	Medi
6	1035			1	82	CBM	Roof Tile	TF3	Calcareous Ironstone fabric, flat roof tile	Medi
6	1035			1	40	Ceramic	Spindle Whorl	TF2	Sandy fabric, TF2 roof tile made into spindle whorl by shaping around an existing peg hole	Medi
6	1035	3		1		Copper Alloy	Jetton		A Medieval French jetton struck for the queen and her almonry. Obverse inscription: AVE MARIA GRACIA PLENA. Obverse description: Moors head facing right with hair bound. Reverse inscription: +A+/+VA+/+M+/+AI+. Reverse description: Double stranded arcuate cross fleury with central lis. Quatrefoil in each quarter. A direct parallel can be found in Mitchener, p. 158 no. 371	15th
6	1035		1006	1	3	Iron	Nail		shaft, clenched, good	

Phase	Context	SF	Sample	Qty	Wgt (g)	Material	Object	Fabric Code	Description	Spot Date
									condition	
6	1035	1		1	1	Iron	Nail		small nail, shaft and small T-head, good condition	
6	1035	2		1	16	Iron	Nail			
6	1035	7		1		Leather	Leather patten strap		Single toe strap from patten, one of a pair originally, sub-triangular in shape tapering from a wide base to a straight-ended terminal. The base is pierced by three round nail holes, now torn. A faint impressed line above was used to mark out where the nailing should be placed. The tapering sides and the straight top edge are whip stitched suggesting that a second layer (possibly a lining or a textile cover) or an edge binding had been attached originally. A small pair of circular fastening holes, 3mm in diameter and spaced 8mm apart, are present below the top edge. A row of fine grain/flesh stitching with thread impression on the grain side only runs up both sides and up the centre. The moulding of the base suggests it was nailed to the wooden sole with the flesh side outward and the grain side inward to the foot. Leather cattle hide 4mm thick. Height (length) 94nn, max width (at base) 97mm, min width (at top) 30mm.	
6	1035		1006	30	269	Lithics	Flint		medium chunks, flakes and a potential edge retouched piece	
6	1035			1	4	Lithics	Flint		secondary hard hammer flake	PH
6	1035			2	61	Pottery (Medi)	Surrey Whiteware	C16	jug handle	M13th-15th
6	1035			1	11	Pottery (Medi)	Herts Glazed Ware	C58		13th-15th
6	1035	4		1		Wood	Wooden Object, board with diagonal cuts and drilled hole		ENV REPORT	

Phase	Context	SF	Sample	Qty	Wgt (g)	Material	Object	Fabric Code	Description	Spot Date
6	1035	5		1		Wood	Wooden Object - [1062]		ENV REPORT	
6	1035	6		1		Wood	Wooden Object - [1063]		ENV REPORT	
2	1065		1027	1		Copper Alloy	Pin		Short pin with slightly hipped shaft towards tip. Decorative biconcical head with spiral decoration on upper side. Small loop at top of head. cf Castle Acre fig.44:47. Good condition, some of shaft still showing shiny bronze colouring. Some of detail on head obscured by corrosion.	L11th-M12th
2	1065		1008		0	Industrial Waste	Magnetic residue			
2	1065		1027		0	Industrial Waste	Magnetic Residue			
2	1065		1027	3		Leather	Fragments			
2	1065	9		1		Leather	Leather turnshoe sole		Turnshoe sole, left foot, adult size, with short, pointed toe, petal-shaped tread medium waist and seat. End of the seat heavily worn away and slight wear at the toe. Heavily worn stitching from the attachment of repair patches (clumps) to the tread and the seat areas. Edge/flesh seam stitch length 6-7mm. Folded when recovered. Leather presumed to be cattle hide, thickness supports this. Length 234+mm, width tread 92mm, waist 45mm, seat 68mm.	c13th
2	1065		1027	2	913	Lithics	Flint		two large chunks	Medi?
2	1065		1008	4	519	Lithics	Flint		three large conjoining fragments of half a flint cobble. One other fragment has potential mortar adhering	Medi?
2	1065		1008	1	0	Mortar	Lime Mortar		fragment	
2	1065		1027	1	16	Mortar	Lime Mortar		lump	
2	1065		1008	2	42	Pottery (Medi)	Herts Greyware	C60		M/L12th-M14th
5	1076			1	136	CBM	Roof Tile	TF2	Sandy fabric, flat roof tile	Medi
3	1081	11		1		Arch Frag	Weathering		Sloping weathering deriving either from plinth or buttress.	1100-1200

Phase	Context	SF	Sample	Qty	Wgt (g)	Material	Object	Fabric Code	Description	Spot Date
									Triangular in section and not surviving to its full length. x 130 y 205 z 157 mm	
3	1081	12		1		Arch Frag	Ashlar		Greatly damaged by ?saturation/?freezing. Three faces survive. This ashlar block may show deliberate demolition damage. It is the only element in the assemblage that seems to have weathered; subsequent to disturbance from its original use. The variable height approximates to a foot (see below). The building stone is apparently inferior to that employed in the other AF. x 295-304 y 230 z 700 mm	1100-1200
3	1081	13		1		Arch Frag	Ashlar		'Small' ashlar with wide beds. It performed a load-bearing purpose (i.e. was not just for facing purposes). Complete (eight facets) except for patinated damage. Differential tooling allows identification. x 210 y c. 200 z 350 mm	1100-1200
3	1081	14		1		Arch Frag	Ashlar		A large and deeply-set ashlar from walling, with rubble corework. The 'parent structure' was implicitly of substantial and good masonry. The absence of weathering indicates that the parent structure was short-lived and all damage is associated with demolition. The dimensions of the ashlar may have cultural significance (Conclusions). Near-complete with some patinated damage (frontispiece) but no weathering .The facets are very differently tooled; the main facet having very regular diagonal marks. There may be a masons' mark but cleaning is required before this can be confirmed. The 'x dimension' (height) does not vary. The horizontal beds are quite narrow. The reverse of	1100-1200

Phase	Context	SF	Sample	Qty	Wgt (g)	Material	Object	Fabric Code	Description	Spot Date
									the block was left in its quarried state. x 295 y c.350 z 354 mm	
3	1081	15		1		Arch Frag	Quoin?		Complete but abraded. Correct orientation is not certain, but two highly-finished facets are at right angles. No weathering apparent. x 254 y c.245 z c.390 mm	1100-1200
3	1081	18		1		Arch Frag	Weathering		This derives from a sloping weathering on ground table or buttress. It may relate to and the 'height' may be significant (see below). Regular workmanship. Five-sided profile (i.e. not ashlar). The tooling is highly variable in precision. The longest 'sloping' side shows unweathered fine diagonal tooling marks. Length incomplete (Z-axis). x 293 y 307 z c.265 mm	1100-1200
7	1085		1030		0	Industrial Waste	Magnetic Residue			
7	1085		1030	1	35	Lithics	Flint		short wide flake with a crushed edge which has been struck	
7	1086		1031		0	Industrial Waste	Magnetic Residue			
7	1086		1031	1	0	Iron	Fragment		poss. nail shaft fragment	

4.5 Timber Assessment

by Damian Goodburn

4.5.1 Introduction

Woodwork from around 1200 AD and the early 13th century rarely survives on most archaeological sites and is only know in very few standing buildings; however a number of structures of timber and round wood have been excavated on other related types of waterlogged sites, particularly on the London waterfront. The volume of systematically excavated recorded and closely dated woodwork of the period found in the London area is unparalleled elsewhere in Britain (probably internationally) and has provided evidence of trends in structural woodworking details and the use of materials through time over the last 2000 years. This work has also been published and archived in quantity and provides comparative evidence relevant to the material from this site and this writer has been extensively involved with this work since 1986 (See Milne 1992,

Goodburn and Minkin 2002, Goodburn 2014, etc). The detailed study of evidence from the London region and elsewhere in Southern England has shown that there was a very substantial change in structural woodworking during the end of the 12th to early 13th century period when the new 'carpentry' with the use of timber framing, pegged mortise and tenon joints and saws largely replaced earlier 'treewrighting' traditions used in the Saxo-Norman period (Goodburn 1999). Therefore structural woodwork of this transitional period is of particular interest.

More specifically the specialist archaeological work in the Greater London area and its hinterland has also included several investigations of sections of moat bridges and smaller structures running along the edges of these types of features i.e. fences and revetments etc. Later in the post-excavation analysis of the woodwork found at this site it will be possible to compare the evidence recorded at this site with this comparative archive, some of which is unpublished. A comparative synthesis of the key features of Medieval bridges, including those then known from moat excavations, was carried out by S Riggold much earlier and published in 1975 (Riggold 1975). Despite being compiled from records of variable quality nearly 40 years ago this survey is also a key comparative source which must be revisited during the analysis/publication phase of this project.

4.5.2 Sill Beam Timber [1031] (Phase 4 G1)

The most significant structural item of woodwork in this group of five numbered timbers on the Northern side of the moat was the substantial jointed sill beam timber [1031]. This oak beam lay horizontal parallel with the Northern edge of the moat (Illus 2).

The beam had been quite heavily truncated on its upper face by later activities and historic decay but many diagnostic features remained allowing us to be reasonably certain that it was the base of a timber framed trestle for some form of moat bridge. The beam survived to its complete length of 4.55m and had a nearly square section c. 220mm by 200mm. The upper face had the clear remains of two large, but decayed mortices, towards each end (See detailed off site 1:10 record drawing). These mortices were c. 320mm long by c. 80mm wide and survived with a maximum depth of 90mm; although an allowance for the truncation of the upper face of the timber showed that they would have been c. 130mm deep originally. These mortice dimensions imply the use of very substantial posts c. 320mm across in at least one direction. Traces of a c. 30mm diameter hole for a single tenon locking peg survived at the southern mortice. Just to the north of the southern mortice the fairly well preserved remains of a skewed lap joint for a diagonal brace rising to the north survived. Parts of the oak brace end and a nearly square cleft oak peg set in a 28mm diameter hole survived. Close to the northern mortice the beam had suffered much more truncation but traces of what appeared to have been a similar skewed lap joint was found. Thus, these joints imply the use of two large tenoned posts with diagonal scissor type bracing up to a cross beam for the trestle frame. This trestle frame would then have to have been connected to a pair of horizontal beams extending out from the northern edge of the moat bank. The clearly implied beams would then have to have been decked over and the bridge deck may also have been fitted with side rails.

4.5.3 Displaced tenoned post base [1066], (Phase 5 G1)

This timber comprised the very decayed tenoned end of a beam of oak that could have derived from a large post or horizontal element (See detailed record drawing). It was found set nearly vertical in the soft moat fill, next to the [1031] sill beam and very close to the northern post mortice. It is thus very tempting to see it as probably the displaced decayed remnants of the post that once occupied that mortice. However, the overall dimensions of the tenoned, possible, post end were somewhat smaller than needed to fully occupy the mortice. The [1066] timber was squared from a whole log and as a result of considerable decay it had lost much of its external surface and the core had been voided by rot. This latter condition ruled out taking a tree-ring sample. The maximum dimensions of the timber were 0.48m long by 230mm wide and 210mm thick. This means that we cannot be totally sure that it was originally one of the trestle posts but neither can we rule it out due to the altering of its dimensions by considerable decay. A rot damaged tenon protruded from one end of the timber and was c. 110mm long by c 200mm wide and c. 80mm thick. Eroded traces of what was probably part of a locking peg hole just survived.

4.5.4 Split beam fragment [1067] (Phase 5 G1)

A short fragment, casually split off one side of a boxed heart oak beam was also found near the north end of sill beam [1031]. This timber [1067] had one fairly squarely cross cut end and the other was very decayed suggesting it may have been set upright for a while rather than 'on-face' horizontally as it was found. It would appear to have been used with two blocks of stone as part of a line of stepping stones (See site plans). The timber survived 0.32m long by 250mm wide and 90mm thick. As the timber had come from a fast grown parent tree, had no sapwood and only c.30 annual rings it was not viable for tree-ring sampling.

4.5.5 Upright timber [1068] (Phase 4 G1)

This item appears to have been a large round wood stake set vertically near the north end of sill beam [1031]. It was recorded as 80mm in diameter, and 0.43m long and was tree-ring sampled on site. Its function is not clear.

4.5.6 Horizontal timber element [1069] (Phase 5 G1)

This small beam fragment was found lying horizontally next to timber [1066] and again would appear to have been a short fragment split out of a larger beam, quite possibly demolition debris. It survived 0.4m long by c. 100mm square and was not sampled or examined off-site.

NB - * It seems likely to this writer that the woodwork allocated to this group [1070] represents at least two phases of activity. The sill beam timber [1031] appears to be in situ parallel with the northern edge of the moat, whilst the other elements appear to have been displaced during the probable demolition of the moat bridge. It may also be possible that the NE-SW line of two mudstone blocks and timber beam fragment [1067] were stepping stones to gain dryer access to the trestle area during the demolition?

Accessible substantial oak timbers would have been worth salvaging but digging up the sill beam may have been considered too much effort.

4.5.7 Elements of timber group or 'structure' [1033], stakes round wood and small timber fragments. (Phase 6 G1)

Stakes and horizontal elements (Not woven rods)

Although this loose grouping of two main N-S stake alignments and some horizontal timber and pole fragments was initially referred to in the records as a 'hurdle', no horizontal rods were found woven round the uprights in the manner we would expect in either wattle work woven in situ or as in portable wattle hurdle panels. Therefore it is suggested here based on seeing the material in the ground and examining the plans and lifted worked items, that either structure or group [1033] was actually the truncated remains of two parallel light wattle revetments with other loose elements or possibly more likely that it was the truncated remains of the base of some form of dead hedge type fence/revetment. Dead hedges are vertical structures, usually intended as fairly short life boundaries, made with a double line of stakes between which brushwood and other debris is simply dumped horizontally. They are nowadays still occasionally used as fences around recently cut coppice woodlands or fields intended to keep out domestic or wild animals and people for conservation purposes. They rarely last longer than c. 3 years or so. So it may be that what was found along the south side of the partially in-filled moat was a rather crude and short lived dead hedge fence stopping folk and animals crossing the ditch. The structure would certainly not have acted as any kind of substantial revetment to the southern edge of the ditch running on the line of the once deeper moat.

The total elements that can reasonably be associated together under this umbrella context number is16 of which 6 were lifted for detailed examination off-site. These comprised large sections of small round wood stakes [1040], [1041], [1042], [1043], [1071], and [1072]. These varied in diameter between 30 and 45mm and none appear to have been high quality, regular coppiced round wood. They were clearly a variety of species, but it would appear that stake [1043] was probably ash and [1071] almost certainly of elder with its characteristic soft pith. It is therefore likely that this material was obtained from casual pruning of scrubby or hedge trees rather than carefully managed coppice woodland. The longest lifted section was 0.36m. Only stake [1040] retained its point which was of chisel form made with one blow of an axe or bill hook. The whole impression given is of a casually made structure not intended to last.

Alongside the stakes horizontal, kerb-like small timbers and pole sections were found, laid mainly E-W. These were recorded and sampled on-site and were only briefly examined by this writer. They were mainly sections or slightly decayed oak branch wood or in the case of item [1058] a split half pole of oak *c.*125mm wide and at least 1.58m long. This item was tree-ring sampled (sample <1004>). Again this material appeared to have been leftovers and scrap material or possibly firewood.

4.5.8 Isolated small stakes in the middle of the moat (Phase 6 G1)

Two small round wood stakes were found and planned in situ in the middle of the moat [1046] and [1047]. These items of worked round wood were not passed on to this author but stake [1046] was Sp Id sampled on-site (sample <1029>). The original function of these widely spaced small stakes is unclear, but it is clear that they were not part of the [1033] structure(s).

4.5.9 Woodwork from deposit [1065] (Phase 2 G1)

Cut beech log end [1065] - (May need to alter labelling here?...)*
Towards the south end of sill beam [1031] and at a lower level the well preserved remains of a section of beech log were found ([1065] see record drawing). The log was still in the round and had its bark on when found. A section of the log was lifted and examined by this writer off-site which proved to have been cross cut roughly with an axe. Large cross cut saws appear to have been very rare at until the end of the Medieval period. The axe cut end could have been part of a 'V' shaped felling cut or from cross-cutting ('bucking') a felled tree. The axe marks were up to 80mm wide and slightly curved but none were quite complete, so the width of the axe blade would have been greater. This item may have been part of a displaced log pile such as were found used in large numbers in the moat of the Tower of London or simply firewood debris. The timber was tree-ring sampled for possible dating.

4.5.10 Small timber items from moat fill deposit [1035] labelled as small finds

Small find 4 (Phase 5 G2)
This item was initially thought to have been part of a small oak board on-site but after cleaning was found to be part of a small board of stained radially cleft beech pierced by one 20mm peg hole (See Drawing). One end had been obliquely axe cut whilst the other was decayed. The item survived 0.39m long by 90mm wide and 25mm thick. Its original function is uncertain, but radially cleft boards of oak and beech were widely used in the earlier Medieval period for many purposes. The item was tree-ring sampled.

Small find 5 (Phase 5 G2)
This item appears to have been a fragment of broken, forked branch wood of 40mm diameter, with one oblique cut end (drawing). This could be pruning or lopping debris.

Small find 6 (Phase 5 G2)
This item was a small fragment of radially split beech that was very squashed but retained an axe cut point on one end whilst the other was broken (drawing). It survived 0.19m long 85mm wide and c. 20mm thick. The form of the item suggested that it had been either the pointed end of a fence pale or a large piece of woodworking debris.

Loose timber jointed fragment [1062] from fill [1035] (Phase 5 G2)
This small fragment of oak timber had clearly been casually split out of a larger jointed timber of some form (See Drawing). It was still pierced by half a 20mm peg hole and part of what seemed to have been a small mortice or lap joint only 90mm wide. The scale of the object suggests an origin in something like furniture or a vehicle rather than in a building.

4.5.11 An assessment of the comparative significance of the woodwork

It must be fairly noted that this relatively small assemblage of woodwork, that has suffered both historic decay and more recent damage, is of local and possibly regional importance but not wider. It is part of the story of the castle and its surrounds and the sequence on site and thus justifies targeted publication in due course as a section in a wider report on the archaeological project. It must be noted that the amount of published waterlogged Medieval woodwork found in Bedfordshire is small and this site adds to the regional corpus.

4.5.12 Recommendations

The material has been summarized above and its key features and wider significance for understanding the historic use of the site outlined. Here we might simply summarize the potential for further analysis as modest but worthy of some targeted comparison with similar moat bridges and woodwork assemblages found elsewhere. There is also some scope for partial graphic reconstruction of the truncated bridge trestle structure which was clearly not the first timber structure built across that part of the moat.

4.6 Ecofactual Data

by Laura Bailey and Tim Holden

4.6.1 Introduction

Samples ranging in volume from 10 to 40 litres were processed for environmental assessment. Several phases of activity, dating from the Medieval (Phase 2) to Modern period (Phase 10) were identified on site. Samples from Phase 2 features relating to the silting and deposition of primary moat fills included the fill (1065) of moat [1032]. Phase 6 features- deposits relating to the construction of a dead hedge structure included deposits (1034 and 1035), within ditch recut [1075] and the fill (1085) of ditch [1084]. The aims of the assessment were to assess the presence, preservation and abundance of any palaeoenvironmental remains in the samples. Several fragments of wood, previously recorded and sub-sampled were also received for microscopic examination in order to identify species. The environmental remains are quantified in Tables 7, 8, 9 and 10.

4.6.2 Method

Eight samples were subjected to flotation and wet sieving in a Siraf-style flotation machine. The floating debris (the flot) was collected in a 250 µm sieve and, once dry, scanned using a binocular microscope. Any material remaining in the flotation tank (retent) was wet-sieved through a 1mm mesh and air-dried. Some of the samples were from waterlogged contexts, therefore, six 500ml sub-samples taken from three deposits (1034, 1035, 1065) were sieved through meshes of 4mm, 1mm and 500µm for the recovery of plant macrofossils. All samples were scanned using a stereomicroscope at magnifications of x10 and up to x100. Identifications, where provided, were confirmed using modern reference material and seed atlases including Cappers *et al.* (2006).

4.6.3 Monolith sample

A monolith sample was taken through the basal deposit 1035 to the top of the underlying chalk deposit 1034, filling ditch [1032] and re-cut [1075] respectively. During the excavation, ten grab-samples were taken at 0.10m increments adjacent to the monolith in order to assess the preservation of plant macrofossils and potential for pollen analysis.

Two samples adjacent to the monolith, were evaluated, along with the standard bulk samples above, to assess the preservation of organic remains in the monolith itself (Samples 1016 and 1020 from the base and top of deposit 1034, at 60-70 and 90-100cm above the base of the moat).

Context Number	Sample Number	Feature	Phase	Sample Vol (l)	Building material				Stone		Glass	Metal			Industrial Waste		Organics	Unburnt bone	Shell		Uncharred seeds/fruit	Uncharred nutshell	Uncharred wood	Waterlogged Wood	Charred cereal grain	Charcoal		Material available for AMS Dating	Cinders	Coal	Comments
					Pottery	Clay pipe	CBM		Lithics	Stone		Cu object	Pb object	Fe object	Fe slag	Mag res	Textile	Mammal	Marine	Terrestrial						Quantity	Max Size (cm)				
							Brick	Tile	Mortar																						
1007	1000	Fill of probable periglacial feature	5	20			++			+++	+																				
1009	1001	Fill of linear feature [1008]	5	20	+++	+	++	+++	+++	+++		++		+	+	+	++		++	+									Yes	+++	+	Oyster shell present
1034	1009	Deposit within ditch re-cut [1075]	4	10					+	+	+								+		+			++					Yes			
1035	1006	Deposit within ditch re-cut [1075]	4	35			++			+++				+					++		+++	+	+	++	++		+	2.0	Yes			Uncharred thorn, oyster, mussel and snail shell present. Hazel nutshell (1g). 4 uncharred Prunus spinosa stones
1065	1008	Primary fill of moat [1032]	1	10	+				+	+++							++		+	+	+	+	++	++++			+	1.5	Yes			Mussel shell present. Hazelnut shell (2g). Contains uncharred *Prunus* sp stone. Uncharred Apiaceae sp
1065	1027	Primary fill of moat [1032]	1	35			+			+++	+		+				+++	++	+	+	+	+	++	+++		+	+	1.0	Yes			Cu Pin and mussel shell present. Hazelnut shell (2g). Contains 1 barley grain. *Prunus spinosa* stone.
1085	1030	Backfill of ditch [1084]	1	40			+			+++							++		++		++						+	0.7	Yes			
1086	1031	Deposit located to south of [1084]	1	10			+			++				+																+		

Key: + = rare (0-5), ++ = occasional (6-15), +++ = common (15-50) and ++++ = abundant (>50)
NB charcoal over 1cm is suitable for identification and AMS dating

Table 7 – Retent Sample Results

Context Number	Sample Number	Feature	Total flot Vol (ml)	Charred seeds	Charcoal Quantity	Charcoal Max size (mm)	Material available for AMS	Comments
1007	1000	Fill of probable periglacial feature	150		+	1		
1009	1001	Secondary fill of linear feature [1008]	100	+		10	Yes	Contains *Sambucus nigra* (both charred and uncharred), *Polygonum aviculare*, *Chenopodium* sp. Also contains terrestrial snail shell. Possibly previously waterlogged.
1085	1030	Backfill of ditch [1084]	10					Contains terrestrial snail shell ++
1086	1031	Deposit located to south of [1084]	10		++	5	No	
Key: + = rare (1-5), ++ = occasional (6-15), +++ = common (16-50) and ++++ = abundant (>50) **NB** charcoal over 1cm is suitable for identification and AMS dating								

Table 8 – Flotation Sample Results

Context Number	Sample Number	Feature	Phase	Total flot Vol (ml)	*Sambucus nigra*	*Carex* sp	*Rumex* sp	*Urtica dioica*	*Polygonum aviculare*	*Chrysanthemum segetum*	*Ranunculus* sp	*Prunus spinosa*	*Stellaria media*	Small *Caryophyllaceae* sp	*Hyoscyamus niger*	*Chenopodium* sp	*Menyanthes trifoliata*	*Silene* sp	*Potentilla* sp	*Torilis* sp	*Rubus fruticosa*	Moss	Leaf, grass, sedge fragments	Wood fragments	Charcoal Quantity	Charcoal Max size (mm)	Material available for AMS	Comments
1034	1009	Deposit within ditch re-cut [1075]	4	##		+	+														+	+	+++	++				
1034	1016 (60-70 cm)	Deposit within ditch re-cut [1075]	4	##		+				+												+				+			Also contains occasional snail shells.
1034	1020 (90-100cm)	Deposit within ditch re-cut [1075]	4	##	+			+				+									+			+++				
1035	1006	Deposit within ditch re-cut [1075]	4	##	++		++		+				+									+		++	++				Beetle fragments, Daphnia sp eggs and terrestrial snail shell fragments +
1065	1008	Primary fill of original ditch cut	1	##		++	++	++			++			++	+		+	+	+	+	+		++	+++				Contains terrestrial snail shell ++, Fly puparia +, Daphnia sp eggs and beetle casing
1065	1027	Primary fill of original ditch cut	1	##		++			+							+						+	++	+++				Also contains textile fragment (poss. felt?), land snail shell fragments, mouse? bone and beetle casing. Contains several organic peaty lumps. Contains abundant Daphnia sp eggs

Key: + = rare (1-5), ++ = occasional (6-15), +++ = common (16-50) and ++++ = abundant (>50)
NB charcoal over 1cm is suitable for identification and AMS dating

Table 9 – Waterlogged Samples

4.6.4 Wood identification

Wood samples were thin sliced along radial, tangential and transverse sections using a razor blade and then bleached before being mounted on a slide in glycerol and examined under a microscope at x100 and x400 when required. Wood sections were identified using features described by Schweingruber (1978, 1990) and IAWA (1989).

4.6.5 Results

Results of the assessment are presented in Tables 7 (Retent samples) and 8 (Flot samples), 9 (Waterlogged sample) and 10 (Wood samples). Material suitable for AMS (Accelerated Mass Spectrometry) radiocarbon dating is shown in the tables.

4.6.7 Waterlogged plant remains

The majority of samples showed very good organic preservation with seeds, fruits, leaf fragments and wood charcoal surviving (Tables 7, 8 and 9). The largest number and most diverse waterlogged plant remains were from the primary fill (1065) of ditch [1032] and included sedges (*Carex* sp), knot grass (Polygonum sp), nettles (*Urtica dioica*), buttercup (*Ranunculus* sp), henbane (*Hyoscyamus niger*), bog bean (*Menyanthes trifoliata*), bramble/ blackberry (Rubus fruticosa), a probable plum stone (*Prunus c.f. domestica*) and sloe (Prunus spinosa) stones. Frequent monocotyledon (grass/sedge etc.) fragments were also present. The weed 'seeds' from the samples are typical of wet and disturbed nitrogen-rich ground.

Weed 'seeds' including elder (*Sambucus nigra*), docks (*Rumex* sp) and corn spurry (Stellaria media) were recovered from the fill of ditch [1075].

A small number of plant remains including monocotyledon, moss and woody stem fragments were present in deposit (1034), together with sedges, docks, corn marigold (*Chrysanthemum segetum*), bramble and blackthorn/sloe stones.

4.6.8 Wood charcoal

A small amount of heavily fragmented charcoal was present in deposits (1007) and (1009) and (1085).

4.6.9 Insect remains

Fragments of beetle exoskeleton were recovered from deposits (1035) and (1065). Occasional fly puparia were also present in deposit (1065).
Water flea (*Daphnia* sp) eggs were abundant in deposits (1035) and (1065). Daphnia live in various aquatic environments from acidic swamps to freshwater lakes, ponds, streams and rivers.

4.6.10 Snail shell

A small number of garden (*Helix aspersa*) and freshwater (*Planorbis* sp) snail shells were present in deposits (1035), (1065), (1034), (1009) and (1065). The largest number was recovered from the fill (1035) of ditch recut [1075].

A small number of heavily fragmented oyster (*Ostrea edulis*) shell was present in deposits (1035) and (1009) and heavily fragmented mussel (*Mylitus edulis*) shell in deposits (1065) and (1035).

4.6.11 Other remains

Finds recovered from samples, including pottery, lithics and brick recovered from the retents will be discussed as the subject of a separate report.

4.6.12 Waterlogged wood

Several samples of waterlogged woodwork were taken during excavation. Where it was not possible to identify the wood fragments visually material was sub-sampled for microscopic examination in order to identify species. Species including hazel (*Corylus avellana*), beech (*Fagus silvatica*), ash (*Fraxinus excelsior*), oak (*Quercus* sp) and elder (*Sambucus nigra*) were identified.

Context	Sample	Description	Species
1035		SF 6- Pointed end of fence pale or woodworking debris from moat fill	*Fagus silvatica*
1035		SF 5- Branch wood- pruning or lopping debris from moat fill	*Corylus avellana*
1040		Round wood stake	*Corylus avellana*
1041		Round wood stake	*Sambucus nigra*
1042		Round wood	*Corylus avellana*
1043		Round wood	*Fraxinus excelsior*
1046	1003	Round wood	*Fagus silvatica*
1059	1002	Round wood	*Quercus* sp
1061	1029	Wood fragment, part of structure [1033]	*Sambucus nigra*
1069		Horizontal timber	*Quercus* sp
1071		Round wood stake	*Sambucus nigra*
1072		Round wood stake	*Sambucus nigra*

Table 10 - Wood species identification results

4.6.13 Discussion

The ditch fill appears to have accumulated between the 13th century, based on the historical date of the construction of the castle (i.e. not before 1216 and not after 1223-4), and the 15th century, based on a coin recovered from early in Phase 6.

Organic plant and other biological remains were well preserved in all assessed deposits (1065, 1035 and 1034) from the moat, probably as a result of a high water table. The remains suggest periods of natural silting and deposition of settlement debris such as pottery, shellfish and animal bone, in the ditch.

Phase 2

A diverse range of environmental material was recovered from the basal fill (1065) (Phase 2) of moat [1032]. The plant remains suggest stages of natural infilling of the moat which was bordered by waterside and scrub vegetation. The majority of plant remains were taxa of ruderal, scrub and wetland habitats, from moist, nutrient rich soils. However, a small quantity of hazelnut shell, sloe stones, a barley grain and possible plum stones, all preserved by water logging, were also present, together with mussel shell suggesting that some remains derived from domestic sources. The small amount of pottery, a copper alloy pin and shoe fragments support this supposition. Small numbers of fly puparia, beetle and freshwater snail shell were also present in deposit (1065). The aquatic invertebrates and water fleas would have been able to colonise the water at the bottom of the ditch.

Phases 3, 4 and 5

No environmental samples were recovered from Phase 3 relating to the deposition of rubble within the north side of the moat and construction and demolition of the Trestle bridge.

Following the demolition of the trestle bridge the moat was recut [1075] (Phase5), probably to remove demolition material from the bridge superstructure, which may have impeded water flow through the moat. A set of vertical stakes, and horizontal timbers forming a dead hedge were driven through the primary fills of the moat recut and several humic fills (Phase 6), containing wooden objects, leather and pottery, built up around the base of the structure.

Phase 6

Waterlogged plant remains from the fill (1035) of the moat recut [1075] (Phase 5) were not as abundant or diverse as those recovered from the basal fill (1065) and included docks, elder, knotgrass, henbane and moss. The presence of henbane in the sample is interesting. It is both a weed of disturbed ground and has medicinal properties. A small amount of hazelnut shell and sloe stones were also present in the deposit. More finds were recovered from this deposit than any other and included iron nails, flint and wooden objects. A horse skull and several fragments of animal bone were also present and cumulatively suggest deliberate dumping of debris during this phase.

Deposit (1034) contained few palaeoenvironmental remains. Plant remains included docks, sedges, brambles, moss and wood fragments. A small number of terrestrial snail shells and water flea eggs were also present.

Phase 7

No environmental remains were recovered from the fill (1085) of ditch [1084], a linear feature located at the North Eastern end of site. However, occasional charcoal fragments were present in the sample from clay surface [1086], a deposit possibly belonging to the castle interior, also located in the North Eastern area of site.

Phase 9

A series of features post-dating the moat were excavated. A single fragment of charcoal was recovered from deposit 1007. Both charred and uncharred 'weed' seeds including elder, knot grass and fat hen (*Chenopodium* sp) were recovered from the fill (1009) of linear feature [1008] together with a small amount of snail shell.

Summary

Overall, the basal fill of the moat was rich in organic remains and contained a large variety of plant remains. The Phase 4 deposits contained similar types of plant macrofossils and biological remains, though fewer and less variety, and more anthropogenic remains. This suggests a transition from periods of natural sediment accumulation and occasional deposition of anthropogenic material, to periods of dumping.

Palaeoenvironmental potential to address the objectives of the project

Assessment of the environmental remains suggests that the preservation of organic remains, particularly in the basal moat fill (1065- Phase 2) is excellent and the palaeoenvironmental potential of the deposits is very good. The palaeoenvironmental remains could address many elements of the research objectives including 'character and development' and 'society and economy.

Analysis of palaeoenvironmental remains, particularly when combined with the results of previous excavations, would provide information on the 'nature of the castle', how the castle changed use after 1223 and occupation of the site. The presence of natural indicators such as beetles, fly puparia, water fleas, snails and weed seeds together with material from domestic sources provide a better understanding of the source of material in the ditch and the natural environment of the ditch.

Given the survival of biological material already observed, the preservation suggests that pollen, fungal spores and human parasite eggs may also survive.

Recommendations

Analysis of environmental material associated with the construction and occupation of the castle, from the basal fill (1065) of ditch [1032], together with the phase 4 deposits will undoubtedly provide additional information on human activity adjacent to the moat and the character of the immediate landscape. Systematic analysis of the hand collected animal bone and the standard bulk samples from this and previous investigations on the site, will provide data regarding the environment and how the use of the moat has changed with time.

A much higher resolution picture of change based on the microfossils from the monolith samples could potentially be obtained but this is not recommended unless there are specific archaeological questions relating to the use and abandonment of the moat that required this level of environmental detail.

4.7 The Faunal Assemblage

by Laura Bailey and Tim Holden

4.7.1 Methodology

The animal bone assemblage was very small and comprised a standard archiving box of both hand collected bone and that from environmental retents, weighing 2174g. The assemblage was from 6 contexts including the fill (1009) of linear feature [1008], fills (1034 and 1035) within ditch re-cut [1075], the primary fill (1065) of moat [1032] and the backfill (1085) of ditch [1084]. The majority of animal bone was from Phase 4 features.

The aims of the assessment were to provide a basic quantification of the available data, to characterize the assemblage as far as possible and to help identify the potential of the data-set to address the aims of the project.
Identifiable fragments were recorded, together with the preservation and any signs of modification of the bone in order to assess the quality, quantity and potential of the assemblage. Where possible, fragments were identified to species level using Schmid 1972.

4.7.2 Condition

A brief description of the bone condition is present in Table 1. Many of the bones from the moat were dark brown in colour indicating waterlogged conditions. The condition is variable ranging from very poor to fair. ‘Good’ would be applicable to fresh bone and could provide anatomical measurements as well as age at death, butchery and pathology.

The surfaces of the bones are generally unabraded with butchery marks (Knife cuts and chop marks) visible. Many of the bones are split longitudinally and radially, perhaps for marrow extraction.

Whole bones were rare in all contexts but complete articular ends and teeth were present and will permit the retrieval of some metrical data, allowing for example, comparison with other assemblages.

4.7.3 Species present

The assemblage comprised bones of domesticated mammals, with elements of cattle, horse and sheep all present. The majority of identifiable animal bone fragments were from Phase 4 features. A horse skull was present in a deposit (1035) in ditch re-cut [1075], together with cow mandible fragments, sheep/goat humerus, and mandible and

skull fragments with horn core attached. The horn core was sawn near the tip, probably to remove the outer sheath.
Only small amounts of animal bone were present in Phase 1 features. Heavily fragmented bone was recovered from the primary fill (1065) of moat [1032]. Sheep mandible and heavily fragmented long bone was present in the backfill (1085) of ditch [1084]. Many of the long bone fragments in this deposit were vertically and longitudinally split.

4.7.4 Discussion

The assemblage offers some insight into site economy and was dominated by the bones of large domestic mammals, particularly cattle and horse, and occasional sheep. The majority of identifiable bones were recovered from Phase 4 features (1035) and suggest that elements of animal were deliberately dumped in the ditch.
Skull fragments with horn cores attached were recovered from two deposits (1081 and 1035) from phases 2 and 4. Previous excavation in the area also recovered skull fragments with the base of the horn core still attached and were interpreted as the disposal of horn-working waste dating to the post-Medieval period or earlier (Albion Archaeology 2009).

4.7.5 Recommendations

While the assemblage does provide some evidence of the species exploited by the people living in the area, the small quantity of bone will not allow any meaningful statistical analyses on the relative proportions. However, the presence, of possible horn working waste, similar in character to material recovered from previous phases of excavation is of note and should be included to the publication report.

4.8 Potential of Datasets to Address Original Research Objectives

The potential of each dataset to contribute to the project's original research objectives is summarised in Table 10.

	Objective	Contextual	Other Artefacts (incl coin)	Pottery	CBM	Masonry	Animal Bone	Molluscan Remains	Wood	Leather	Plant Remains	Charcoal
1	Is there evidence of an entrance to the castle and of any stockade/wall?	High	-	-	-	High	-	-	High		-	-
2	How does the Moat in the DA differ from the sections already excavated?	High	High	-	-	-	-	-	High	High	High	-
3	Do remains of a Medieval road and other activity survive outside of the castle?	High	-	-	-	-	-	-	-	-	-	-
4	What was the nature of the castle?	High	High	-	Low	High	-	-	-	-	-	-
5	What role does topography play in the way in which land within the castle was used?	High	-	-	-	-	-	-	--	Medium	Medium	-
6	Do physical remains at the DA bring an understanding of how the castle changed use after 1223?	High	Medium	Low	Low	Low	Low	Low	Low	Low	Low	Low
7	How does the occupation/use of the site develop during the medieval/post-Medieval periods?	High	High	High	High	-	High	Medium	High	Medium	Medium	Low
8	What can the DA tells us about the development of Luton as a Medieval and post-Medieval town?	Medium	Low	Low	-	-	-	-	-	-	-	-
9	How can comparison between Robert de Waudari's and Fulk de Breaute's castles increase our understanding of both sites?	High	Low	Low	-	-	-	-	-	-	-	-

High	Dataset is able to contribute direct, significant data which can expand our knowledge in this area.
Medium	Dataset can contribute direct data which will be relatively standard for this chronological period and region.
Low	Dataset has a relatively low potential to augment our knowledge of this subject. It may be of only minor relevance to the research aim, or may help to add to a database of 'less significant evidence' which, when combined, is useful in recognising patterns, e.g. pottery assemblages, settlement types.
-	Dataset has no potential to provide useful information on this subject.

Table 10: Potential of recovered datasets to address the original research objectives

5. RESEARCH OBJECTIVES FOR ANALYSIS

5.1 Introduction

Following assessment of the various datasets, it has been possible to refine and add to the original objectives (Table 5). The ways in which these research objectives will be addressed are listed below, with reference to national and regional research frameworks. Original research objective 9 (comparing Robert de Waudari and Fulk de Breaute's castles) has not been retained, for lack of new, useful evidence. Objectives 1-6 and 8 have been retained. These relate to the use of the Castle in the period Fulk was alive, following his expulsion and into the Medieval period. They also relate to the topography of land upon which the castle was constructed and the ways in which land outside and inside the Castle Moat was used. Objective 7 is retained but modified in order to better exploit the evidence gathered; it covers the ways in which this piece of land was likely to have been used in the later Medieval and post-Medieval periods.

The above original research aims are integrated into our new set of revised research aims (below).

5.2 Revised research objectives

Table 6 summarises the potential (Low, Moderate, High) of each dataset to contribute to the revised research objectives for analysis.

Character and Development

What was the nature of the castle?

Previous excavations have revealed the plan of the castle moat, around its southern and western extents. The most recent program of investigation (Woodley & Abrams, *forthcoming*) has demonstrated that the interior of the castle was the location of industrial activity, and was divided into separate zones.

This investigation has provided possible evidence for bridge building relating to the construction of Fulk's Castle. The beech timber recovered from the primary fill of Fulk's moat [1032] bears a resemblance to surplus beech timbers discarded into the Tower of London moat during construction works in the early 1240's (Keevil, 2004), where they were associated with piling, and the construction of a gatehouse and bridge. The assemblage of structural stone from the base of the ditch, which has been identified as coming from the same parent material as that used to construct Bedford castle, has a high potential to inform an interpretation of the scale and nature of Fulk's Castle in Luton. Analysis of environmental material associated with the construction and occupation of the castle, from the basal fill (1065) of Fulk's moat [1032], together with the phase 4 deposits will undoubtedly provide additional information on human activity adjacent to the moat and the character of the immediate landscape.

The artefacts form a useful, datable assemblage. To this end, analysis should concentrate on the architectural fragments, the copper alloy pin, the leather turnshoe, the early pottery and the possible flint strike-a-light. Full reports should be produced on all these finds, citing typological information and referencing comparative finds at

other sites. These reports will be useful in supporting interpretation made using contextual and ecofactual data.

Is there evidence for an entrance to the Castle site and how was land used immediately outside the Castle Moat/entrance?

This agenda also subsumes the question of whether there is any evidence for an entrance or wall, the answer has been provided by the contextual data, the timber and stone assemblages; it now remains to place these sources of information in context, and allow them to feed into our interpretation of how the castle changed over time, especially following its apparent 'destruction' after Fulk's expulsion. How thoroughly was the Castle site 'destroyed' and did it in fact retain a powerful political, trading and financial position within the town long after that period?

Of course the presence of a bridge at this point in the moat perimeter at this point is direct evidence of a route way immediately adjacent to it. The geography of Medieval Luton (REF EUS and Matt Edgeworth incl the specific illustration showing it) was already relatively well understood and a road running adjacent to this site (broadly on the line of modern day Park Street?) was already predicted. We appear to have confirmed what Edgeworth was suggesting by identifying the Southern boundaries of the Castle, a bridge and entrance into it and an absence of substantive buildings immediately south of that entrance.

The topography of this site is significant. The way in which water was introduced into the Moat, moved around it and managed within it will have been carefully considered by its designers. The most colourful story pertaining to Fulk (with regard to Luton) revolves around exactly the issue of water management…..Matthew Paris….flooding of church land…no regrets…etc. Our investigation has identified a very different potential (at the southern end of the castle) for the preservation of ecofactual material. Does this suggest micro-topography of the castle site was designed to ensure water was deeper at this important entrance?

How does the Moat in the DA differ from the sections already excavated?

Two sections were excavated across the moat in 2009 on the western side of the castle complex, opposite St Mary's church. These sections demonstrated three distinct episodes of backfilling, the earliest of which was tentatively interpreted as a series of deposits "associated with redevelopment of the area during the 13th century" (Keir, 2011). These investigations showed the presence early on in the sequence of plant macrofossils which suggested that industrial activity related to processing flax had been taking place somewhere in the vicinity. The contextual data from the 2014 excavation has a high potential to provide a useful comparison to these findings, as does the geoarchaeological data, which was collected from the north-west facing section of the 2014 excavation.

Do physical remains at the DA bring an understanding of how the castle changed use after 1223?

The contextual data recovered from the site has a high potential to answer this research question; the sequence inside the moat cut includes silting, deposition of

occupational debris from the initial occupation of the castle (up to 1224), demolition of a substantial stone structure, possibly a gatehouse or part of the curtain wall. Demolition of the castle was followed by the construction of a trestle bridge using recycled timbers, creating a new entrance to the castle complex. Dendrochronological analysis of five samples from this set of timbers, and a further timber from the later dead hedge is recommended in order to confirm a felling date for structural timbers associated with the castle.

The construction of a make-do entrance to the castle (made necessary by a moat which was still flooded) is likely to have been associated with the reclamation of the manor of Luton by William Marshall in 1229, an event identified in the Luton EUS (Albion, 2007: 18). The demolition of the trestle bridge and the recovery of its upright timbers may coincide with the abandonment (dated to the late 13th – early 14th century) of the industrial area uncovered by Headland in 2011 (Woodley & Abrams, forthcoming). Historical narrative in the Luton EUS suggests another change in ownership which may be coincidental with this abandonment: in 1274, when the manor was inherited and divided between the six daughters of Isabel de Clare (Albion, 2007: 18).

After demolition of the trestle bridge the moat was re-cut and cleaned, but was susceptible to periods of drying out which eventually required the construction of a temporary "dead hedge" boundary. A terminus ante-quem of the late 14 to early 15th century had been given for the material around the dead hedge based on the identification of a Moor's Head Jetton imported from the continent, suggesting that the sequence of events described above took some two hundred to two hundred and fifty years to develop.

The contextual data could be lent nuance by the collection of geoarchaeological samples which have a low potential to inform the interpretation of the made ground deposit which underlies the bridge, and the environmental samples which have a high potential to demonstrate a palynological and plant macrofossil sequence from the lower fills of the moat. A much higher resolution picture of change based on the microfossils from the monolith samples could potentially be obtained but this is not recommended as there are no specific archaeological questions relating to the use and abandonment of the moat that require this level of environmental detail.

Society and Economy

How does the timber assemblage from Fulk de Breaute's Castle compare to other examples of Medieval moat bridges?

The potential of the worked timber assemblage has a low potential to inform the regional and national debate but worthy of some targeted comparison with similar moat bridges and woodwork assemblages found elsewhere. A graphic reconstruction of the truncated bridge trestle structure, which was clearly not the first timber structure built across that part of the moat, will be commissioned.

What can the artefact and ecofact assemblages tell us about the occupation of the site?

The artefact assemblage includes a number of small finds and ecofacts (high potential) as well as a modest ceramic assemblage (low potential). Seen in relation to the assemblages from elsewhere in the castle complex, these could add to our understanding of the castle as a centre of consumption. The presence of local and imported ceramic wares, metalworking worn as personal adornment and imported coinage throughout the first two hundred years of occupation might suggest that Fulk de Breaute's' Castle continued to be a high status site after he was exiled. As this site represents the first waterlogged assemblage, including leather, and wooden objects, contingency should be afforded for the conservation of ecofacts and small finds for display in Luton Museum which has agreed to receive the full archive.

Systematic analysis of the hand collected animal bone and the standard bulk samples from this and previous investigations on the site, will provide data regarding the environment and how the use of the moat has changed with time.

What can the DA tells us about the development of Luton as a Medieval and post-Medieval town?

The regional research agenda for Bedfordshire (Oake et al, 2007), competed before the any of the current investigations on the University of Bedfordshire site were finished, focuses on the extensive work which has been undertaken in Bedford town centre, including excavations and evaluations at Fulk de Breaute's' castle there. Following on from the Extensive Urban Survey, which indentified the Medieval "core" of Luton and other towns within the county, (Albion Archaeology, 2003) the research agenda prioritises the collection and analysis of data from other Medieval settlements in Bedfordshire and the undertaking of "basic work on the origins and development of small towns" (Oake, 2007: 15). The contextual data has a low potential to answer this particular question, however ecofactual and artefactual evidence could go some way to suggest how resources, such as timber and stone for constructing high status buildings were controlled. The site produced some interesting finds such as the jetton, the leather patten strap, and floor and roof tiles. The potential of these finds is limited, but if this period is discussed, and then a short report on the finds and the evidence they provide for both the dating and character of the activity post-dating the castle. Allowance should be made for the illustration of a few finds to accompany this. The jetton and the patten strap are of particular interest.

Summary of Post Excavation Analysis

Finds

Full reports (containing description, analysis, comparison with relevant assemblages and data in tabulated form) will be produced on the copper alloy pin, the leather turnshoe, the early pottery and possible flint strike-a-light, citing typological information and referencing comparative finds at other sites. Short reports (containing description and brief analysis of significance) will be produced on the later material, namely the jetton and patten strap. Line drawings will be produced of the turnshoe, the spindle whorl and a jar and bowl rim of Herts Greyware, along with the patten strap from the later assemblage. Cut away photos will be produced of the Pin, and the Jetton, with a section through the pin.

A short unpublished archive report (containing description, analysis, comparison with relevant assemblages and data in tabulated form), separate from the main report, will be produced for the prehistoric lithics assemblage, detailing the context of their discovery and a finds catalogue. This will be submitted to Central Bedfordshire and Luton HER.

Architectural Fragments

A full report (containing description, analysis, comparison with relevant assemblages and data in tabulated form) will be produced on the architectural fragments citing typological information and techniques used in the construction at Luton. Due to the homogeneous nature of the assemblage, which consists entirely of ashlar fragments, comparisons with contemporary sites are not likely to further our knowledge of the castle structure. However a diagram showing the likely position of the plinth stone (SF <11>) in a reconstructed wall will be provided.

Timber

A full report (containing description, analysis, comparison with relevant assemblages and data in tabulated form) will be produced on the timber assemblage, including the remains of the sill beam and trestle bridge, and the dead hedge. The modest amount of published material on waterlogged medieval woodwork in Bedfordshire makes it necessary to seek comparanda outside the county. Dendrochronological analysis will be commissioned from Ian Tyers on two samples from the sill beam, one from the beech log at the base of the Moat and one from a large fragment of oak set into the dead hedge. Illust A reconstruction drawing of the bridge will be produced as an illustration in the published article.

Geomorphological Analysis

Three kubiena tins were driven through a layer of demolition rubble belonging to phase 3, in order to ascertain the circumstances of deposition. This was at a time when the bridge sill beam was thought to have been contemporary with the original occupation of the castle. The updated contextual analysis now places the demolition layer at the abandonment of Fulk's castle, and the bridge with a later occupation. Geomorpological analysis of the phase 3 deposits is therefore no longer needed to enhance understanding of the contextual archaeology.

Ecofactual Assemblage

Assessment has already been carried out as part of the post-excavation assessment including processing of bulk soils samples, pollen grab samples, wood and charcoal ID and analysis of insect remains. Pollen survival was found to be good throughout the deposits targeted with monoliths, however, coarse analysis of the pollen from the grab samples suggests that further work on the monoliths should not be undertaken in the absence of specific research questions. Full reports (containing description, analysis, comparison with relevant assemblages and data in tabulated form) compiling the results of analysis on plants, invertebrate and molluscan remains will be produced,

taking into account the short-lived nature of the castle as a military site and its subsequent use. Comparisons will be sought with relevant assemblages from the excavations on the western circuit of the moat, at Bedford Castle and further afield.

Faunal Assemblage

A short report (containing description and brief analysis of significance) will be produced on the faunal assemblage, as the small quantity of bone will not allow any meaningful statistical analysis to be undertaken. The report will make note of the presence of possible horn working waste which appears to be a theme elsewhere in the castle complex.

	Category	Objective	Contextual	Pottery	Masonry	Lithics	Metal Objects	Leather	Wood	Animal Bone	Molluscan Remains	Monolith Analysis	Plant Remains	Dendrochronology Samples
1	Character and development	• What was the nature of the castle?	High	-	High	Medium	Medium	Medium	High	High	-	-	-	-
		• Is there evidence for an entrance to the castle site and how was the land used immediately outside the Castle Moat/entrance?	High	Low	High	Low	Low	Low	High	Low	Low	Medium	High	High
		• How does the Moat in the DA differ from the sections already excavated?	High	Low	Low	-	High	-	-	Low	High	High	Medium	Low
		• Do physical remains at the DA bring an understanding of how the castle changed use after 1223?	High	Medium	Medium	-	High	-	-	Low	Low	High	Low	Low
2	Society and economy	• How does the timber assemblage from Fulk de Breaute's Castle compare to other examples of Medieval moat bridges?	High	-	-	-	-	-	High	-	-	-	-	High
		• What can the artefact assemblage tell us about the occupation of the site?	Low	High	High	Low	High	Low	Low	High	Low	-	Low	Low
		• What can the DA tells us about the development of Luton as a Medieval and post-Medieval town?	Medium	High	High	Low	Medium	Low	Low	High	Low	Low	Low	Low

High	Dataset is able to contribute direct, significant data which can expand our knowledge in this area.
Medium	Dataset can contribute direct data which will be relatively standard for this chronological period and region.
Low	Dataset has a relatively low potential to augment our knowledge of this subject. It may be of only minor relevance to the research aim, or may help to add to a database of 'less significant evidence' which, when combined, is useful in recognising patterns, e.g. pottery assemblages, settlement types.
-	Dataset has no potential to provide useful information on this subject.

Table 11: Research objectives for analysis and potential of datasets

6. UPDATED PROJECT DESIGN

6.1 Introduction

This section provides a task list for the analysis, publication and archiving programme. Table 7 provides a description of the tasks associated with analysing each dataset and summarises the tasks associated with publication, archiving and overall project management. Table 8 describes the project team and lists their initials, and Table 9 details the proposed timescale for completion of each key stage in the project.

6.2 Publication Synopsis

An article will be submitted to the editors of Bedfordshire Archaeology for inclusion in that journal. It will contain the following sections. These are derived from the Revised Research Objectives in Section 5.2, Table 6 (this document). Analysis and the written report which is the product of this work is an iterative task, therefore, the following outline is subject to change as ideas evolve and new ideas are generated.

Section	**Pages**	**Illus**
Introduction		
• Project background	¼	
• Site location and description (including geology and topography)	¼	1
• Archaeological and historical background	1	2
Results of investigation		
• Medieval		
o Acquisition of land by de Breaute and construction of Castle	1 1	3
o The Moat Cut and Primary Fills	1	
o The Demolition of Fulk's Castle	1	1
o The construction of a Trestle Bridge and the re-claiming of land by the Marshall family	¼	
o Life at the Castle site during the 14th century. The Re-Cut Moat, Dead Hedge and cultural material falling into the Moat	¼ ¼	
• Post Medieval		
o features on the Park Street Frontage		
o Buried Soil		
• Modern development		
Discussion	2	
Conclusions	1	
Acknowledgements	½	
References	1	
Appendices		
• *Artefactual assemblage*	4	
o *Timber*		1

- *Architectural Fragments* 1
- *Pottery* 1
- *Metalwork* 1
- *Ceramic Building Material* 3
- *Leather*
- *Lithics*

- *Ecofactual assemblage*
  - *Animal bone*
  - *Insects*
  - *Charcoal*
  - *Molluscs*

Table 12: Summary of all tasks associated with Analysis, Publication and Archiving

Task Names divided by Key Stage	Description of Task	Title/ Organisation initials	Person Days
Structural analysis liaison/meetings	On-going discussion will take place between the principal members of the project team throughout the analysis and publication stages. These will involve discussion over the nature of the work required, as well as commissioning the work and addressing any queries that arise during the course of the analysis.	PO	2
Analysis of HER and historical maps	The Bedfordshire Historic Environment Record and other sources of documentary material will be visited to provide background information on archaeological sites in the vicinity. The focus will be on Medieval sites in the vicinity. All relevant maps, photographs and other documents will be examined.	PO	2
Contextual, Sub-Group and Group analysis	Each context will be assigned to a single Sub-Group, consisting of one or more (usually several) contexts that are closely related both stratigraphically and interpretatively. The Sub-Group to which each is assigned will be determined by analysis of the primary contextual information, specifically context sheets and sections/plans that were produced on site. The fills of features will be assigned to separate Sub-Groups from their cuts. The only exceptions to this are for deposits interpreted as packing or lining, and for primary fills that formed only a short time after the feature was constructed. For deep features that may have filled up over a long period of time, more than one Sub-Group will be used in order to separate their lower and upper fills. However, to ensure that their spatial location is easily identifiable, they will be issued a Sub-Group number comprising a decimal point of the 'containing' Sub-Group. For example, the non-primary lower fills of enclosure SG7 would be assigned to SG7.1, and the upper fills to SG7.2. When assigning contexts to Sub-Groups, the artefactual and ecofactual assemblage recovered from each context will be considered. This will identify any that contained significant assemblages which may need to be referred to in detail in the descriptive section of the publication text. Such contexts will also be separated out at Sub-Group level. Groups will be composed of Sub-Groups that are stratigraphically similar, and which combine to form a coherent unit of contemporary activity. Sub-Groups containing non-primary fills may be assigned to separate Groups, in order to reflect the possibility that they are considerably later in date than the construction/primary fill Sub-Groups, and would therefore need to be analysed separately. However, to ensure that their spatial location is easily identifiable, they will be issued a Group number comprising a decimal point of the 'containing' Group. For example, the non-primary fills of farmstead G7 would be assigned to G7.1.	PO	1

Task Names divided by Key Stage	Description of Task	Title/ Organisation initials	Person Days
Phase analysis	Each Group will be assigned to a higher level of interpretation known as a Phase, which may contain one or more Groups. Each Phase will represent a chronological period. A plan will be produced for each Phase, with the location of all relevant Groups marked. The following example allows us to tell the *story* of some postholes which were created to hold timbers for a building in use in an Iron Age settlement. That building was abandoned and the postholes became infilled during the early Roman Period, when the land was part of an arable field. To tell that story means that fills and cuts unified within one, and more, postholes need to be divided according the Period they were created and the Phase of activity which caused that. In order to achieve those, it was necessary to divide them amongst different Groups and sub-groups. This system has the flexibility to discuss Features where that is useful and to separate elements of those same Features and discuss those where that adds value to our *story*. Example 1: How do the Primary Fills of postholes in Structure 1 fit in?	PO	1

Period – Iron Age (700BC-AD43)	
Phase 1 (Settlement 1, late Iron Age 100BC – AD43)	
Group G1 – Structure 1	
Sub-Group SG1.1 – primary fills and cuts of post holes in Structure 1 (G1)	
Starting with the following contextual data	
Primary Fill (301), Secondary Fill (302) of posthole [300]	Cut of posthole [300]
Primary Fill (304), Secondary Fill (305) of posthole [303]	Cut of posthole [303]
Primary Fill (307), Secondary Fill (308) of posthole [306]	Cut of posthole [306]

Example 2: How do the Secondary (and final) fills of postholes in Structure 1 fit in?

Period – Roman Period (AD43-AD410)
Phase (Field Systems, early Roman period AD43-AD150)

Task Names divided by Key Stage	Description of Task		Title/ Organisation initials	Person Days
	Group G2 – Remains related to the abandonment of Iron Age Settlement			
	Sub-Group 1.2 – Secondary fills of post holes in Structure 1 (G1)			
	Starting with the following contextual data			
	Primary Fill (301), Secondary Fill (302) of posthole [300]	Cut of posthole [300]		
	Primary Fill (304), Secondary Fill (305) of posthole [303]	Cut of posthole [303]		
	Primary Fill (307), Secondary Fill (308) of posthole [306]	Cut of posthole [306]		
Assistance with structural analysis	The Project Manager will discuss the process of contextual analysis (Sub-Grouping, Grouping, and Phasing) with the PO on a regular basis in order to ensure this iterative process benefits from a range of ideas/experiences brought in from other projects.		PM	0.5
Pottery transportation				0.5
Specialist liaison			FM	2
Cleaning and Stabilisation of Objects	Leather objects to be conserved by Pieta Greaves ACR (Birmingham Museum and Art Gallery) Cu Alloy pin to be cleaned by Scottish Conservation Studio		BMT SCS	1 1
Timber Samples to be dendro dated	Three samples from the sill beam and further samples from the dead hedge to be sent to Ian Tyers for dendrochronological analysis		IT	2
Architectural Fragments to be cleaned	Mark Samuels to be consulted as to which two fragments are worthy of inclusion in the report (in order to demonstrate the presence and nature tool marks). These will then be cleaned by HA S&E staff		HA	0.5
Keystage 1: completion of analysis				

Task Names divided by Key Stage	Description of Task	Title/ Organisation initials	Person Days
Structural phasing/publication liaison	Once the final phasing has been established, the various specialists will be informed. Each will receive detailed Phasing information, the required format of their publication text, and any other information that they may require.	PO	1
Pottery phasing & publication text	Checking/adjustment of the provisional chronology of the pottery with reference to the stratigraphic matrix. Checking the whole assemblage for cross-fitting sherds from different contexts. Full publication of the pottery by phase, with appropriate data tables, and a discussion of the assemblage in its regional context.	FS/ Freelance,	1.5
Architectural fragment report text	To be completed by Mark Samuels.	MS	2.5
Timber report text	Completed		
Dendro report text	Completed	IT	1
Copper alloy pin report text	Completed	FS	0.5
Flint strike-a-light report text	Report text to include comparison with similar mall finds from previous phases of archaeological work on the castle site.	FS	0.5
Leather turnshoe report text	Completed	QM	-
Jetton report text	Completed	RH	-
Patten strap report text	Completed	QM	-
Prehistoric Flint Archive Report	Report text to be completed by Headland Archaeology Finds Specialist and Submitted to Central Bedfordshire and Luton HER	JF	1
Illustrations			
Timber Illustration	Permatrace drawings completed by Damian as part of the initial analysis. Drawings to be traced by HA graphics	GD	

Task Names divided by Key Stage	Description of Task	Title/ Organisation initials	Person Days
	department.		
Reconstruction Illustration of Bridge	Reconstruction of bridge and associated structures to be produced in liaison with Damian	GD/TS	
Illustration of 2x Architectural Fragments	2x worked stone fragements to be illustrated with photographs	GD/PO	0.5
Diagrammatic Illustration of Plinth Structure	Completed by Mark Samuels along with Architectural Fragment report	MS	0.5
Illustration of Leather Turnshoe	Line drawing	GD	0.6
Copper Alloy Pin Illustration	Cut away photo and section	GD	0.3
Illustration of Jetton	Cut away photo	GD	0.2
Illustration of Patten Strap	Line Drawing	GD	0.6
Illustration of Spindle Whorl	Line Drawing	GD	0.3
Illustration of Pottery	2x rim fragments of Herts Greyware – a Jar and Bowl	GD	0.3
Environmental			
Environmental Manager	Report editing and management	ED	1

Task Names divided by Key Stage	Description of Task	Title/ Organisation initials	Person Days
Insects Report	Invertebrate report	ET	4
Plant Analysis and Report	Plant analysis and wood ID report text	ED	10
Processing 11 Grab Samples to Wet Sieve	Completed	ED	1.5
Snail Report text	Molluscan report text	FS	0.5
Animal Bone Report	Animal bone report text	ED	2
Handling and Contingency		ED	1
Keystage 2: completion of all specialist text			
Structural illustration	The digitised plan and section data will be interrogated via the relational database tables to produce mock-up publication illustrations. Plans will be produced to show all features in each Phase with Groups identifiable.	PO & GD/HA	2
Assistance with structural illustration	The Project Officer will advise and assist the Graphics section in order to ensure illustrations are as helpful to the reader and integrated with the text as is possible.	PO/HA	1
Production of site narrative and integration of all specialist publication reports to create site narrative report	The site narrative will form the basis of the descriptive section of the publication text. It will be organised by Period, Phase, Group and, where appropriate, Sub-Group and context number. A report will be submitted to the AO that is suitable for inclusion in an approved archaeological journal, in this case Bedfordshire Archaeology. The chronological phased development of the site will provide the basic structure for the site narrative. Within each Phase, text will be organised by Group, with artefactual and ecofactual information integrated into the text as appropriate. Evidence from documentary, cartographic and photographic sources will be integrated into this chronological framework.	PO	4
Assistance with site narrative report	The Project Manager will assist the Project Officer where necessary. Input may be given by other individuals with experience of similar sites etc.	PM/HA	1

Task Names divided by Key Stage	Description of Task	Title/ Organisation initials	Person Days
Amendments and queries in consultation with specialists during article preparation	The Project Officer will work in consultation with specialists in integrating reports into the article. The synthetic narrative of the article will set the tone and direction with specialist contributions serving this aim. Certain technical data may be saved to the project archive rather than appear in print in order to ensure an un-cluttered and interesting narrative.	PO/HA	1.5
Production of synthesis	The assessment suggests that the discussion will concentrate on the evidence from the Medieval period, in particular, what seems to be an activity/craft area of the castle complex and what happened to it during the period, with the focus lying on the related research objectives identified in Section 5.2. Remains from the other represented periods will form a smaller part of the discussion. Further analysis of the material relating to those periods will be guided by the data presented in this assessment. The outline of the publication should be considered as only a guideline, and may be altered during the analysis and pre-publication stages if the results warrant it.	PO	2
Editing publication text **Keystage 3: completion of 1st Draft**		PM/PO	1.5
Headland's refereeing process **Keystage 4: Submission to Bedfordshire Archaeology**		-	1
Submission to Bedfordshire Archaeology		-	
Amendments resulting from editor's comments		PO	0.5

Task Names divided by Key Stage	Description of Task	Title/ Organisation initials	Person Days
Proof reading		-	0.25
Printing		-	-
Archive preparation (Structural)	On publication of the final report the archive of materials (subject to the landowner's permission) and accompanying records will be deposited with Luton Museum, Accession Number 2011:64.	PO	1
Archive preparation (Artefacts)	In accordance with guidelines (Museums Luton 2008) 'Procedure For Preparing Archaeological Archives For Deposition With Registered Museums In Bedfordshire'	FS/HA	1
Archive preparation and liaison with Museum			1
Archive microfiching			-
Archive transfer (storage costs)			-
Archive transfer			0.5
Project management (Overall)			0.5
Project management (Headland)	The management of the project includes monitoring the task budgets, programming tasks, checking timetables, and liasing with all members of the project team.		0.5
Keystage 5: end of project			

6.3 The Project Team

To ensure a consistency of approach, the same specialists will be used (as far as possible) who have been involved in the assessment stage of the project.

Task	**Organisation, Title and Name**	**Initials of Title**
Daily management	Headland Archaeology (HA), Project Manager, Joe Abrams and Project Officer, Jake Streatfeild-James	PM/PO
Structural analysis	HA, Project Officer, Jake Streatfeild-James	PO
Investigative cleaning and stabilisation	Scottish Conservation Studio	SCS
	Pieta Greaves ACR (Birmingham Museums Trust)	BMT
x-radiography	Scottish Conservation Studio	SCS
Pottery analysis	Freelance Finds Specialist, Paul Blinkhorn	FS
CBM & Stone building material analysis	Mark Samuel – *Architectural Archaeology*	AA
Coin Analysis	Richard Henry	RH
Leather Analysis	Quita Mold – Barbican Research Associates	QM
Flint analysis	HA, Finds Specialist, Julie Lochrie	FS
Timber	Damian Goodburn	DG
Animal bone	HA, Environmental Department	ED
Plant remains	HA, Environmental Department	ED
Invertebrates	HA Environmental Department, Emma Tetlow	ET
Charcoal	HA, Environmental Department, Laura Bailey, Tim Holden	ED
Illustration	HA, Graphics Department	GD
Archiving	HA, Project Officer, Jake Streatfeild-James	PO

Table 13: The project team

6.4 Timetable

Following acceptance by the client and AO of the assessment and Updated Project Design, Headland would like to proceed rapidly with analysis and publication of the results. This would ensure that project momentum is maintained.

Table 9 sets out the five key stages within the analysis and publication programme. An indication of the time required to reach the first three key stages is indicated, and these could serve as appropriate monitoring points, if required.

Task	**Anticipated date of completion**
Structural Analysis	January 2015
Quantification and recording by specialists	February 2015
Completion of KEY STAGE 1	
Compilation of specialist reports	March 2015
Completion of KEY STAGE 2	
Compilation of 1st draft	April 2015
Completion of KEY STAGE 3	
Refereeing	May 2015
Completion of KEY STAGE 4	
Publication of report*	Mid-Late 2015
Deposition of archive	Late-2015
Completion of KEY STAGE 5	

Table 14: Provisional timetable to complete the project

*Publication, and therefore deposition of the archive with Luton Museum, will be dependent on the publication timetable of *Bedfordshire Archaeology*.

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