

Archaeological Evaluation Report

The Glebe House
5 Grange Lane
Cople
Bedfordshire



Quality Check

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KDK Archaeology Ltd



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Summary

In May 2020 KDK Archaeology Ltd undertook an Archaeological Evaluation at The Glebe House, 5 Grange Lane, Cople, Bedfordshire. Two evaluation trenches were excavated within, or close to, the development footprint and despite the site's location within the postulated core of the medieval settlement of Cople, and the proximity of earlier remains in the general area, no archaeological features or artefacts were encountered. The absence of archaeology and lack of stratigraphic disturbance suggests that the development area was either situated outside of the core medieval settlement, or it was located between widely dispersed features within that village.

1 Introduction

1.1 In May 2020 KDK Archaeology Ltd undertook an Archaeological Evaluation at The Glebe House, 5 Grange Lane, Cople, Bedfordshire. The project was commissioned by Nicole Murray, and was carried out according to a Written Scheme of Investigation prepared by KDK (Kaye 2020), and approved by Bedford Borough Council Historic Environment Team (BBCHET), Archaeological Advisor (AA) to the Local Planning Authority (LPA), Bedford Borough Council. The relevant planning application reference is 19/01729/FUL.

1.2 Planning Background

This evaluation has been required under the terms of National Planning Policy Framework (NPPF) and a Brief (Saunders 2020) prepared by BBCHET in order to inform development proposals.

1.3 The Site

Location

The site is situated in the village and civil parish of Cople, in the unitary authority of Bedford Borough at National Grid Reference (NGR) 510270 258414 (Fig. 1).

Description

The site is located on the south side of a residential development and Grange Lane, c. 100m west of the junction with Willington/Northill Road. There is a graveyard to the west and agricultural land to the south (Fig. 2).

Geology and Topography

The bedrock geology consists of the Peterborough Member which is Mudstone formed approximately 164 to 166 million years ago. This is overlain by superficial deposits of undifferentiated sands and gravels from the Stoke Goldington and Felmersham Members formed up to 2 million years ago (http://mapapps.bgs.ac.uk/geologyofbritain/home.html). It is on level ground, slightly elevated from Grange Lane at *c*. 25.10mAOD.

Development

The development consists of the erection of new dwelling housing and garage to the front of existing dwelling (Fig. 3).



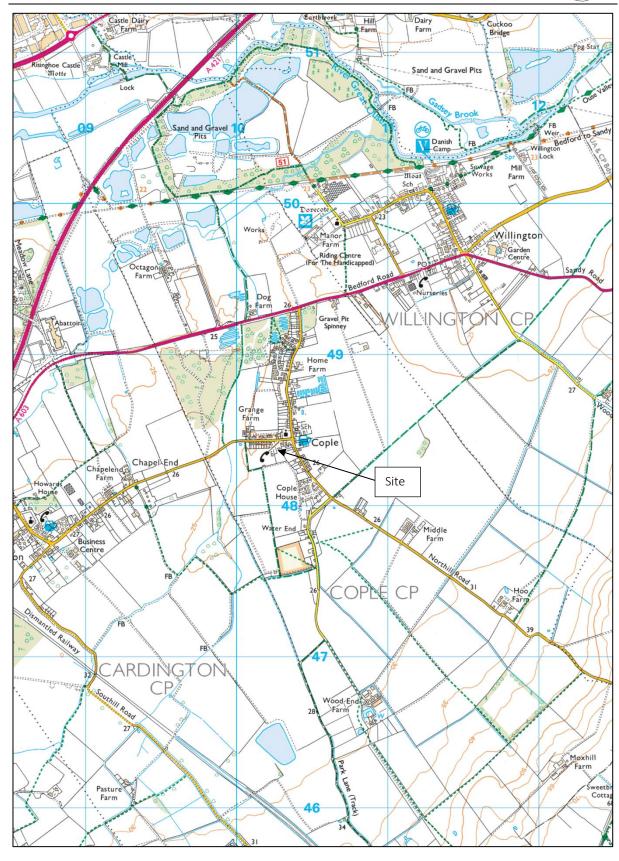


Figure 1: General location (scale 1:25,000)



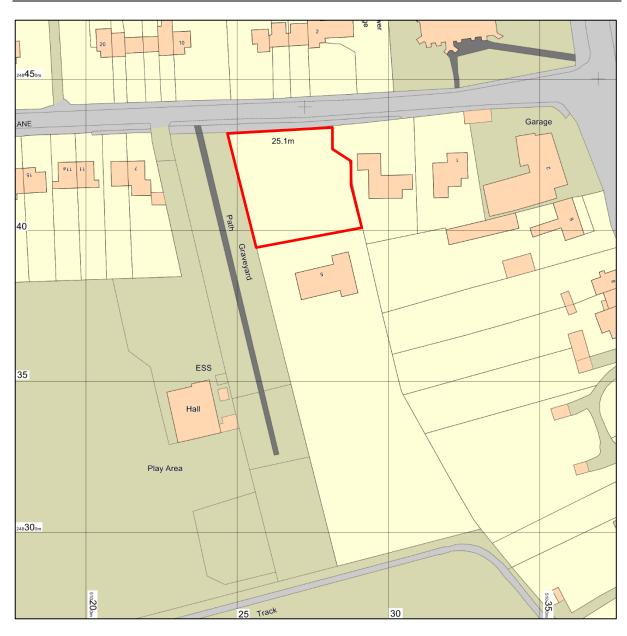


Figure 2: Site location (scale 1: 1,250)





Figure 3: Development (scale as shown)



2 Aims and Methods

- 2.1 The aims of this project as defined in the approved WSI (Kaye 2020) and in the Brief (Saunders 2020) prepared by BBCHET, were:
 - To establish the location, extent, date, character, significance and quality of any surviving archaeological remains within the development area.
 - To establish the relationship of any remains found to the surrounding contemporary landscape.
 - To recover palaeo-environmental remains to determine local environmental conditions.

In addition, the development site was considered to have the potential to contain the remains of occupation dating from the Neolithic through to the Iron Age, Roman and medieval periods. Thus, site specific research themes included, *inter alia*:

- The identification of Neolithic occupation site
- Neolithic and Bronze Age material and cultural change
- Consideration of various aspects of the Iron Age to Roman transition (Bryant 2000, 16; Oake 2007: 11)
- The relationships between Neolithic settlements, together with variation and transformations in settlement types (Medlycott 2011: 13-14)
- The spatial and chronological relationship to earlier Iron Age and later, Roman settlement
- Examination of the landscape setting of sites

2.2 Methods

In line with the requirements of the Brief, this is the first part of a staged investigation whereby the results of this stage will be assessed to determine the need and extent of further stages of archaeological investigation. The methods used were as follows:

• Stage One: An archaeological field evaluation of the site consisting of a minimum of 40m² to be investigated equivalent to two 10 x 2m trenches, plus an appropriate contingency. The trench plan proposed in the WSI (Kaye 2020) in shown in Fig. 4, though it had to be revised to accommodate services encountered during fieldwork.

2.3 Standards

The work conformed to the following requirements:

- The design Brief
- The relevant sections of the Chartered Institute for Archaeologists' Standard & Guidance Notes (CIfA 2014)
- The Chartered Institute for Archaeologists' Code of Conduct (CIfA 2014)
- Current English Heritage guidelines (HE 2015, EH 2008)
- The Association of Local Government Archaeological Officers East of England Region Standards for Field Archaeology in the East of England (ALGAO 2003)



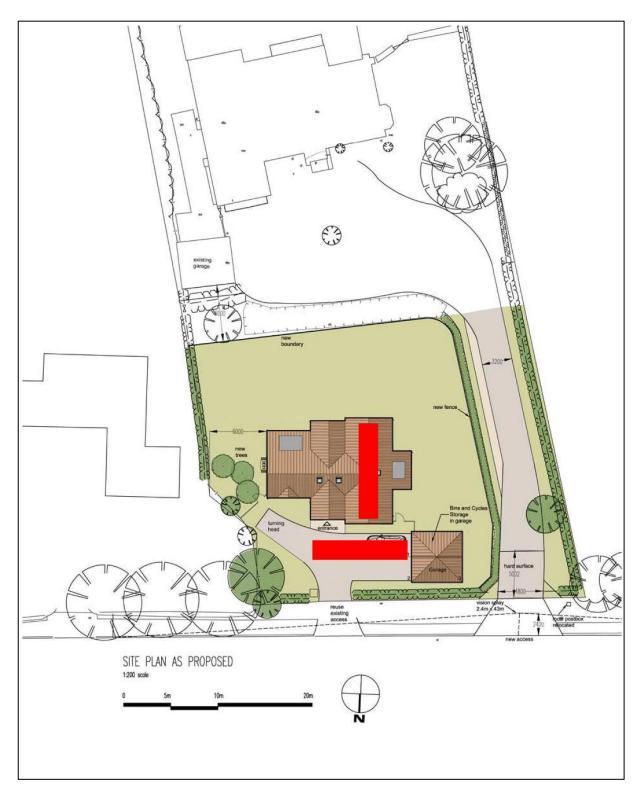


Figure 4: Proposed trench plan (scale 1:400)



3 Archaeological and Historical Background

3.1 There is evidence for human activity from the prehistoric period onwards in the form of a causewayed enclosure, Iron Age/Romano-British settlement, and present village probably dates from at least the late Saxon period. Cople is mentioned 8 the Domesday Survey of 1086, though at that time it was called "Chochepol/Cochepol". The name possibly derives from the phrase "Cock Pool" meaning somewhere to keep chickens.

This section has been compiled with information from Bedfordshire Historic Environment Record (with a 1km search radius; HER Data Licence No: BBHER 026 2018-19), previous KDK reports (Bertrand 2015) KDK's own library, and reliable online sources.

Prehistoric (before 600BC)

There are a number of prehistoric finds in the vicinity, the earliest were two Palaeolithic hand axes and two flint flakes found in 1968 in Cople parish, though the exact location is unknown (MBD 3268). A Neolithic or Bronze Age barbed flint arrowhead was also found on a farm in Cople in 1972, though its precise location is not known (MBD 9287 & MBD 22627).

Within the study area, a geophysical survey, followed by trial trenching carried out in late 2014 and early 2015 recorded a probable prehistoric pit alignment, running approximately north—south along the east side of the Cople Brook, in a field in part opposite the development site (EBB 904). These features are visible as crop marks in satellite images.

Crop marks show an interrupted ditch system, or causewayed enclosure, comprising three concentric ditch circuits, overlain by a series of rectilinear enclosures and other features. The causewayed enclosure is of Neolithic date and the other features are likely to be Iron Age or Roman (HER 585).

Iron Age (600BC – AD43)

Immediately northwest of the site and to the west of Grange Farm are rectangular encloses and linear features which continue to the west (HER 16718). These are evident as cropmarks recorded in 1996.

To the south of the site lie two parallel linear flanking ditches of a trackway of probable Iron Age or Roman date, which are also visible as cropmarks on historic aerial photographs (MBB22147). The two ditches vary between 4.5 and 8.5 metres apart. At the western end of the southern ditch, there may be another trackway that diverges west-southwest for a further 175 metres (part of NRHE 1410854), though the relationship between these features is unclear.

A rectilinear enclosure of probable Iron Age or Roman date is visible on aerial photographs from 2009 as cropmarks (MBB22148). Located in fields about 150 metres southwest of the site, the enclosure comprises three linked linear ditches to the west, north and east, c. 70m in length, though no evidence of a southern side was recorded. This enclosure may have formed part of a settlement and field system and it is associated with other nearby settlement evidence, including a pit alignment to the northwest (MBB22149). This is probably of Iron Age or Roman date, though perhaps earlier, and is visible as cropmarks. There are 33 subcircular pits, varying between about 0.7 and 2 metres in diameter, aligned NNE-S. At least 6 other pits not in



alignment are very close by. It is possible the main alignment continues and is recorded again to the north (MBB21763).

East of the site and immediately east of the Northill/Willington Road are further Iron Age/Romano British cropmarks (MBB22144). Ten D-shaped and oval enclosures intersected by 6 or more larger rectangular enclosures, and a trackway were recorded from aerial photographs in 2011. Irregular ditch lines cross both groups and numerous pits are present. The site continues to the north-east where more than five small rectangular enclosures with pits are intersected by two irregular ditches. These probably form a prehistoric or Roman settlement, with the enclosures apparently associated with nearby field systems.

Further evidence of Iron Age activity in Cople, comes with a copper alloy coin recovered from the adjacent field to the southwest of the site (MBB 20002).

Roman (AD43-c.450)

In the same field as the ten D-shaped enclosures, cropmarks have been interpreted as indicating the possible site of a Roman villa (MBB22144). The site consists of accreted and overlapping curvilinear and rectilinear enclosures, some double-ditched. The features continue across a field boundary to the north east. Further areas of settlement are located immediately to the south east and may be associated. An agger, marked by hedgerows is marked on the 1794 map and is thought to be the remnants of a Roman road used into the post-medieval period (HER 11949).

Excavations undertaken in 1951-1952 in the area of the causewayed enclosure uncovered a hearth, and 4th century pottery. Pottery of 2nd to 4th century date was found during field-walking in 1982 (HER 585).

Saxon (c450-1066)

Whilst there is no direct evidence of Saxon occupation in Cople in terms of artefacts or archaeological features, the eight entries in the Domesday Survey of 1086 (Williams & Martin 2002: 574 & 585) show a relatively typical Scandinavian settlement pattern, with several sokemen holding parcels of land that they were able to sell. A priest is mentioned as holding land in 1086, but the land he and Liboret jointly held had belonged to three sokemen. Nonetheless, it is quite likely that there was a church in Cople in the late Saxon period.

Medieval (1066-1500)

In 1086 nearly all of the 10-hide village belonged to Hugh de Beauchamp, and was split among seven tenants (Williams & Martin 2002: 574). One, Robert, held a manor of 4 hides, which subsequently became known as Woodend or Launcelayns Manor. The tenancy of this manor eventually passed to the Rufus family by 1201 until at least 1347, after which it appears to have passed to Launcelyn family The Laucelyns were a family of some status in Bedfordshire with Walter Launcelyn recorded as owning land in the adjacent parish of Northill in 1316, and Richard Launcelyn was justice of the peace for the county in 1382. John Launcelyn, justice of the peace for the county in 1423, is the first member of the family whose name has been found in connection with Cople in 1433. When he died in 1435, it passed to his daughter Anne who married Sir Walter Luke. The estate stayed with the Luke family until 1686 when it was sold to William Gostwick (VCH online). Chicksands Priory owned Cople Manor which was supplemented



by various others in the 13th and 14th centuries. At the Dissolution it was granted to Sir John Gostwick in 1539, becoming attached to Woodend in 1686 (ibid).

Rowlands Manor is first mentioned in 1531. Court rolls survive from 1312 when the Lords of the Manor were Hugh Swyn and Hugh le Boteler. They were still the lords in 1314 but by 1316 Richard Ronland or Rodland was the lord and this family are given as lords until 1381 (BARS Community Archives). John Spencer made a settlement of it, passing it to his son Thomas in 1547. His great grandson Nicholas, married Mary, the daughter of Sir Edward Gostwick of Willington, and died in 1643. Their son William Spencer, was recorded as living at Rowlands in 1691. The Spencer estates in Cople were then bought by Francis Brace for the Dowager Duchess of Marlborough, probably about the same time that the other Cople property was purchased of Sir William Gostwick. By the 19th century it had become part of the Duke of Bedford's estate

A further manor in Cople, known as Hotofts, is first mentioned in 1548, when it was held by Thomas Spencer. It follows the same descent as that of Rowlands, and was still named as a distinct manor in the early 19th century.

Maryons or Malens Manor appears to have belonged to the Maryon family in 15th century Cople, where in 1545 it was held by Lord Braye for the barony of Bedford (VCH online).

In 1310 William Rufus held 46 acres of land of Walter Wigan, which probably became Wiggons Manor, first noted as such in 1506. It followed the same descent as Woodend, with it still being mentioned 18th and early 19th centuries.

The first mention of a priest at All Saints Church is in 1237 with the advowson given to Chicksands Priory in the later 13^{th} century (HER 1039 – MBD1039) The present church was begun in c. 1430, then added to in the 16_{th} and 18_{th} centuries with 19^{th} and 20^{th} century alterations. The churchyard is also likely to be medieval (HER 8879).

The Bedford Borough Historic Environment Record shows the proposed new dwelling is situated in the postulated core of the medieval settlement of Cople (HER 17118). Almost directly opposite the site, c. 200m to the north, is a possible moat (HER 8109). It consists of an elongated pond, generally with two, sometimes three projections to the east are shown on maps of the parish. The position suggests a gravel extraction origin. The same can be said of the possible fish ponds to the east (HER 14769)

Post-Medieval (1500-1900)

In 1799 Cople, Woodend and Rowlands manors were bought by the Duke of Bedford, whose descendants sold them to George and James Keble of Peterborough in 1902. The estates were subsequently split up with a large part coming into the ownership of Colonel Frank Shuttleworth of Old Warden (BARS Community Archives).

Most of the post-medieval features of Cople are related to buildings, of which there are 21 listed on the Historic Environment Record. Most of the buildings listed are extant and date from the 15^{th} to 20^{th} centuries, but none have a direct impact on the site.

Approximately 100m southwest of the site are two known sites of post-medieval gravel quarrying (HER 11296 & 11942).



A bier house stands near the church, now in the garden of 1 Willington Road c. 100m northeast of the site (HER 1955). It was built to house the parish bier, a hand cart, on which coffins were conveyed from the house of the deceased, to the church for burial.

During ploughing of a field near Cople in 1969 a hoard of 35 silver coins of the 16th and 17th centuries was found, some scattered near the ground surface. The hoard was declared a treasure trove but not required for the national collection (HER 9288).

Modern (1900-present)

There is nothing dating from the modern period that is note-worthy in relation to this development.

3.2 The Known Archaeology and History of the Site

The development site is located on the south side of Grange Lane close to its junction with Willington Road/Northill Road within the core of the village of Cople, and is currently occupied by The Glebe House, constructed in the latter half of the 20th century (Saunders 2020: 2). The site is supposedly situated within the postulated core of the medieval settlement of Cople (BBHER17118). No further relevant information is available in the HER.



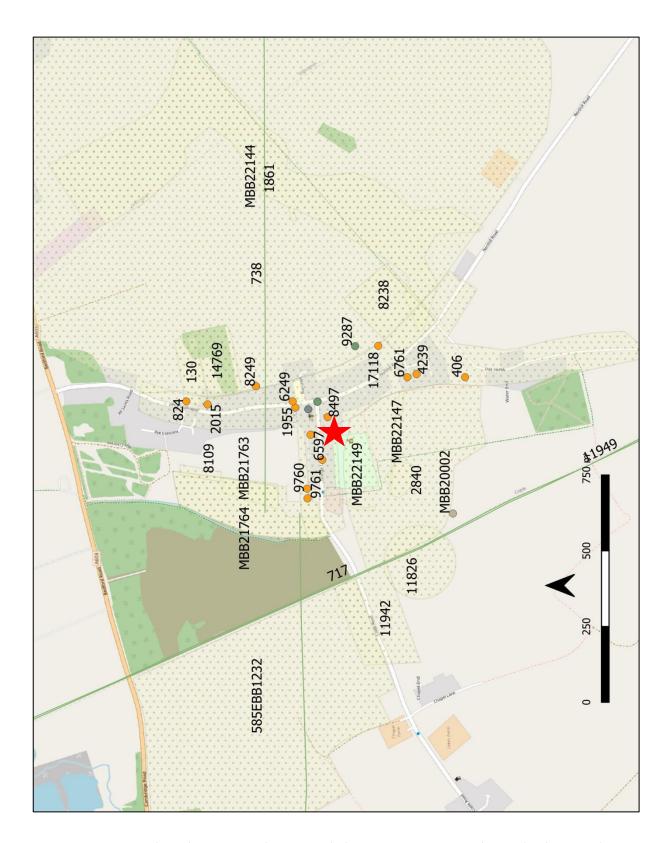


Figure 5: HER data plan: site = red star; stippled areas = monument polygons (scale 1:1250)



4 Results

4.1 *Introduction*

Two evaluation trenches measuring 8m (L) x 2 (W) and 4m (L) x 4m (W), with an area of 32m sq., were excavated within, or close to, the footprint of the development (Fig. 5). The layout of both trenches had to be modified to accommodate the footings design, and to avoid services. Trench 1 was reduced in length by 2m and Trench 2 was resized from the proposed $10m \times 2m$ (Fig. 4) to $4m \times 4m$ due to the presence of a water-main. The excavation was conducted utilising a 3.5 tonne mechanical digger fitted with a 1.2m wide toothless ditching bucket to a depth of 0.7m - 0.8m.

The stratigraphy revealed was uniform (Figs. 6 -7; Plates 1 - 4) across the area excavated, and comprised:

Topsoil (101, 201): Light olive brown, friable sandy silt; 0.08m deep.

<u>Subsoil (102, 2020)</u>: Light brown, compact sandy silt with occasional small sub-angular stones and moderate root activity; 0.60m deep.

Natural geology (103, 203): Firm gravel, containing a considerable amount of clay and silt/sand (hoggin); >0.1-0.25m deep. An exploratory sondage was excavated in the northwest corner of Trench 1 to confirm the identification of the natural geology. A sub-circular depression, extending from the north-eastern baulk of Trench 1, was excavated and revealed to be a natural feature.

On completion of the fieldwork, no archaeological features or finds were revealed within the evaluation trenches.

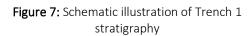




Figure 6: Actual layout of evaluation trenches (scale a shown)







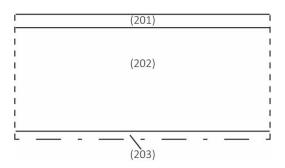


Figure 8: Schematic illustration of Trench 2 stratigraphy





Plate 1: Trench 1, looking south



Plate 2: Trench 1, stratigraphy



Plate 3: Trench 2, looking north



Plate 4: Trench 2 stratigraphy



5 Conclusions

Despite the location of the site within the postulated core of the medieval settlement of Cople, and the proximity of earlier remains in the general area, the Archaeological Evaluation of the development footprint did not reveal any archaeological features or artefacts. Moreover, the stratigraphic profile revealed within both evaluation trenches appears to be undisturbed as it includes a topsoil/subsoil directly overlying natural geology. The absence of archaeology and the lack of stratigraphic disturbance suggests that the footprint of the development was either situated outside of the core settlement, that it was located between widely dispersed features, or the site has not been affected by human activity from any period.

The absence of archaeological features meant that the research aims associated with the project could not be advanced on this occasion.



6 Acknowledgements

KDK Archaeology is grateful to Nicole Murray for commissioning this report. Thanks are also due to Geoff Saunders for providing Historic Environment Records and other relevant documents, and for monitoring the project on behalf of Bedford Borough Council.

The fieldwork was carried out by Dan Phillips BA ACIfA. The report was written by Derek Watson PhD, and edited by David Kaye BA ACIfA.



7 Archive

- 7.1 The project archive will comprise:
 - 1. Brief
 - 2. Written Scheme of Investigation
 - 3. Initial report
 - 4. Trench recording sheets
 - 5. Site drawings
 - 6. Client's site plans
 - 7. List of photographs
 - 8. B/W prints & negatives
 - 9. CDROM with copies of all digital files.
- 7.2 The archive will be deposited with the Higgins Art Gallery and Museum (Accession number BEDFM2020.17).



8 References

Standards & Specifications

Association of Local Government Archaeological Officers (ALGAO) 2003 Standards for Field Archaeology in the East of England. East Anglian Archaeology Occasional Paper 14

Bedford Museum 2010 Procedure for Preparing Archaeological Archives for Deposition with Registered Museums in Bedfordshire

Brickley M. & McKinley J. I. 2004 *Guidelines to the Standards for Recording Human Remains*. Chartered Institute for Archaeologists Technical Paper.

CIfA 2014 Code of Conduct. Reading: Chartered Institute for Archaeologists

CIFA 2014 Standard and Guidance for Archaeological Field Evaluation. Reading: Chartered Institute for Archaeologists

CIFA 2014 Standard and Guidance for the Collection, Documentation, Conservation and Research of Archaeological Materials. Reading: Chartered Institute for Archaeologists

CIFA 2014 Standard and Guidance for the Creation, Compilation, Transfer and Deposition of Archaeological Archives. Reading: Chartered Institute for Archaeologists

EH 2008 The Management of Research Projects in the Historic Environment. PPN3: Archaeological Excavation. London: English Heritage

EH 2011 Environmental Archaeology: A Guide to the Theory and Practice of Methods from Sampling and Recovery to Post-Excavation. London: English Heritage

HE 2015 The Management of Research Projects in the Historic Environment: the MoRPHE Project Managers' Guide. London: Historic England

Kaye, D. 2020 Written Scheme of Investigation for Archaeological Evaluation: Stage 1. The Glebe House, 5 Grange Lane, Cople, Bedfordshire. Unpublished Report for KDK Archaeology 525/CGL

McKinley J.I. & Roberts C. 1993 Excavation and Post-excavation Treatment of Cremated and Inhumed Human Remains. Chartered Institute for Archaeologists Technical Paper 13

Paine C. (Ed) 1992 Standards in the Museum Care of Archaeological Collections. London: Museums & Galleries Commission

Saudners, G. 2002 Brief for a Programme of Archaeological evaluation at the Glebe House, 5 Grange Lane, Cople, Bedfordshire Bedford Borough Council

Walker K. 1990 *Guidelines for the Preparation of Excavation Archives for Long-Term Storage*. London: United Kingdom Institute for Conservation, Archaeology Section

Watkinson D. & Neal V. 1998 First Aid for Finds. Hertford & London: Rescue

Secondary Sources

Bedfordshire Community Archives:

http://bedsarchives.bedford.gov.uk/CommunityArchives/Cople/CopleIndexOfPages.aspx

British Geological Society (BGS): http://mapapps.bgs.ac.uk/geologyofbritain/home.html (Accessed: 16/04/2020)

British History Online https://www.british-history.ac.uk/vch/beds/vol3/pp238-242 [accessed 16th April 2020]



Brown N. & Glazebrooke J. 2000 Research and Archaeology: A Framework for the Eastern Counties – 2 Research Agenda and Strategy. East Anglian Archaeology Occasional Paper 8

Medlycott M. (ed) 2011 Research and Archaeology Re-visited: A Revised Framework for the East of England. East Anglian Archaeology Occasional Paper 24

Oake M. Luke M., Dawson M. Edgeworth M. and Murphy P. 2007 Bedfordshire Archaeology - Research and Archaeology: Resource Assessment, Research Agenda and Strategy. Bedfordshire Archaeology 9



Appendix 1: Photograph List

	SITE NO/O	CODE: 52	5/CGL Site Name: The Glebe House, 5 Grange Lane, Cople, Bedfordshire		
Shot	Digital	View	Subject		
1	1	S	General view of site		
2	2	SW	General view of site		
3	3	W	General view of site: showing area for Trench 2		
4	4	W	General view of site: showing area for Trench 1		
5	5	SE	General view of site		
6	6	SE	General view of site		
7	7	N	General view of site		
8	8	S	Trench 1		
9	9	N	Trench 1		
10	10	W	Indicative section – Trench 1		
11	11	E	Indicative section – Trench 1		
12	12	W	Trench 2		
13	13	N	Trench 2		
14	14	S	Indicative section – Trench 2		
15	15	N	Trench 2 – location of water-main		



Appendix 2: OASIS and Site Data

PROJECT DETAILS							
Project Name & Address The Glebe House, 5 Grange Lane, Cople, Bedfordshire			Project Site Code		525/CGL		
OASIS reference	kdkarcha1-391364		Event/Accession no		BEDFM2020.17		
OS reference	510270 258414		Study area size		32m sq.		
Project Type	Evaluation		Height (mAOD)		25.10, AOD		
Short Description	In May 2020 KDK Archaeology Ltd undertook an Archaeological Evaluation at The Glebe House, 5 Grange Lane, Cople, Bedfordshire. Two evaluation trenches were excavated within the development footprint and despite the site's location within the postulated core of the medieval settlement of Cople, and the proximity of earlier remains in the general area, no archaeological features or artefacts were encountered. The absence of archaeology and lack of stratigraphic disturbance suggests that the development area was either situated outside of the core medieval settlement, or it was located between widely dispersed features within that village.						
Previous work	None		Site status		None		
Planning proposal	Erection of new dwelling housing and garage to the front of existing dwelling		Current land use		Residential		
Local Planning Authority	Bedford Borough Council		Planning application ref.		19/01729/FUL		
Monument type	None		Monument period		None		
Significant finds	None		Future work		Unknown		
PROJECT CREATORS							
Organisation	KDK Archaeology Ltd						
Project Brief originator		Pro	roject Design originator KDK		Archaeology Ltd		
Project Manager	David Kaye BA ACIfA	Dii	Director/Supervisor Dan		Phillips BA ACIfA		
Sponsor/funding body	Nicole Murray, Glebe House, 5 Gr	ange	e Lane, Cople, Bedfordshire				
	PROJEC	T D	ATE				
Start date	15.05.2020	En	d date	15.0	5.2020		
	PROJECT	ARC	HIVES				
	Location		Content (e.g. pottery, animal bone, files/sheets)				
Physical	 		None				
Paper			WSI, Report, Sheets, Drawings				
Digital		Photograph, digital versions of the downloaded to ADS			above and report		
BIBLIOGRA	APHY (Journal/monograph, published	d or	forthcoming, or unpublishe	d clier	nt report)		
Title	Archaeological Evaluation Report: The Glebe House, 5 Grange Lane, Cople, Bedfordshire						
Serial title & volume	525/CGL/2.1						
Author(s)	Derek Watson PhD						
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