WRITTEN SCHEME OF CONSERVATION

Roman & Medieval Archaeology at South Caldecott

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Milton Keynes Council

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SP 88980 33989

Author:
Dr Michael Dawson with

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CgMs Consulting, Ragsdale, 1 Church lane, Great Cransley,
Kettering NN14 1PX
Tel: 01536 790447 Fax: 01536 799378

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EXECUTIVE SUMMARY

This Written Scheme of Conservation describes the importance of archaeology in two area, Unwin's and Woburn, within the South Caldecott: Land South of Milton Keynes - Strategic Employment Allocation in a Statement of Significance. It concludes that the archaeology is of moderate importance and that its status equates to that of non-designated heritage assets.

An assessment of the condition of the archaeology is provided based on the results of the desk based, trial trench and geophysical survey of the development area. This concludes that whilst the archaeology has the potential to address regional research objectives its survival is such that the heritage interest of the asset could be retained by preservation in situ (Roman period remains) and recording (ridge and furrow).

In a further section the potential nature of development impacts on the archaeology have been assessed and provide the basis for two method statements to ensure that the heritage value of the assets is retained. The impact assessment does, however, note the need for a detailed pile solution (see BWB 2019) to span the area of archaeology and ensure that weight of development does not impact on the below ground deposits

The final, concluding section outlines the two methodologies for the cover solution to create a buffer above the below ground archaeology and a recording strategy for the ridge and furrow. Both are based on current projects, in Leicestershire and East Sussex.

1.0 INTRODUCTION AND SCOPE OF STUDY

Introduction

1.1 This Written Scheme of Conservation has been prepared by Michael Dawson of CgMs Heritage (part of the RPS Group) on behalf of Hampton Brook.

1.2 The subject of this assessment is the proposed preservation of archaeological remains at South Caldecott located in land parcels BM239493, 239493 (Unwin) and BM288801 (Woburn). Throughout this report for brevity and clarity these land parcels with be referred by their ownership Unwin's or Woburn unless greater precision is required (Fig 1). The remains lie within a wider site area allocated in the Milton Keynes Council Plan: MK Draft Plan 2017 and intended for commercial and employment use.

Scope of Study

1.3 The objective of the report is to provide a strategy to ensure that the preservation of the heritage values of the archaeological resource at South Caldecott can be retained as part of the development programme (See Fig 1).

1.4 This document has been prepared in accordance with published guidance (Williams 2016) and it comprises five main sections:

- A Statement of the Archaeological Site's Significance
- A statement of the objectives of the WSC which in short is intended to provide the mechanism to ensure that the heritage values identified in the Statement of Significance (above) can be preserved.
- A summary condition report (Based on the evaluation report)
- Summary statement of the development proposals including levels and contours – key information here from Hampton Brook and whether you can retain the topsoil in situ? And the issues raised by this programme.
- Review of Current Practice based on: *English Heritage (Historic England) 2006 Developing Methodologies, The Soil Stack Project, Research News, Newsletter of English heritage's Research Department, 3 2006, 14-15* and *Oxford Archaeology & Cranfield Univ 2009 Trials to Identify Soil Cultivation Practices to Minimise the Impact on Archaeological Sites (Defra Project No:*

BD1705) Effects of Arable Cultivation on Archaeology (EH Project number 3874)

- Method Statement to achieve preservation

1.5 This WSC constitutes part of the planning application to develop the South Caldecott site and can be secured by condition in accordance with Historic England's advice in GPA 2

The Proposed Allocation

1.6 This Written Scheme of Conservation is submitted on behalf of the developer Hampton Brook in support of the proposal to retain the archaeological evidence shown in Figs 2 & 3.

1.7 The site boundaries and area are shown on the accompanying figures.

1.8 The proposed site location is shown at Figure 1 and lies to the south of Caldecott, Milton Keynes centered at NGR SP 88980 33989 (see below and Fig 1).

2.0 STATEMENT OF SIGNIFICANCE

Introduction

2.1 The area identified at South Caldecott has been subject to Desk-Based, geophysical and trial trench evaluation between 2015 and 2018. These investigations revealed two areas of below ground archaeological deposits. These lies close to the carriageway of the diverted A5 where earlier investigation had recorded a small cremation cemetery (MMK 5975) the line of a Roman road running north from Magiovinium (MMK 5974) as well as Roman period stone buildings (MK 686) and Roman period ceramics (MMK 5509).[1] The deposits on the line of the diverted A5 were subject to excavation by D S Neal in the 1980s. Whilst deposits found beneath the carriageway were beyond the scope of the geophysical survey in 2018, the anomalies provided a clear indication that the character and morphology of deposits immediately to the east of the A5 road and within the western section of the development continued the trends noted in the earlier excavations. Trial trench evaluation which followed the geophysical survey confirmed the character of the archaeology as the remains of activities on the periphery of the Roman small town of Magiovinium.

2.2 The below ground evidence is sealed beneath pasture fields in which ridge and furrow of medieval and possibly later date remain as earthworks.

2.3 The significance of a heritage asset is defined in published guidance (NPPF 2019, English Heritage 2008) as the sum of all its heritage values, including any contribution made by its setting. Heritage values are considered under four categories, not all of which will necessarily apply to any given site:

- **Evidential value**: the potential of the Roman deposits to yield evidence about past human activity through physical remains and archaeological deposits;
- **Historical value**: the ways in which past people, events and aspects of life can be connected through the development site to the present, either illustratively (by aiding interpretation of the past) or associatively (through direct links with famous people or events);

[1] See Neal 1987

- **Aesthetic value**: the ways in which people draw sensory and intellectual stimulation from the remains; and

- **Communal value**: the meanings of the Roman remains for the people who relate to it, or for whom it figures in their collective experience or memory.

2.4 The archaeology which is the subject of this proposal lies within the area indicated on Fig 4 (Unwin's and Woburn). In this location the evidence survives primarily as archaeological sites of buried archaeological deposits from the Roman era whilst the earthwork remains at both Unwin's and Woburn comprise the upstanding remnants of agriculture from the Medieval Period. The full extent of archaeology within the South Caldecott Strategic Employment Allocation includes enclosures of Iron Age on high ground to the east; a street running out from the core area of the Roman town, an area of enclosures further to the east beyond a small brook which flows westwards to the River Ouzel an enclosure (Woburn) close to the southern roundabout on the A5 and the earthwork remains of medieval framing (ridge and furrow). This WSC relates to (1) Unwin's, an area of street running north east from the Roman small town of Magiovinium, (2) Woburn an enclosure of Roman date to the south and (3) ridge and furrow earthworks in both Unwin's and Woburn.

Evidential value

2.5 The spatial disposition of the below ground archaeology at South Caldecott indicates that it represents the periphery of the Roman small town of Magiovinium. Evaluation indicates in (1) a short stretch of metalled Roman period street leads north eastwards away from the urban core of the Roman small town towards the open countryside. Initially passing through an area of gravel quarrying, active in the 1st century AD, pressure on the settlement area to the west of the A5 seems to have led to the development of dwellings on plots flanking the street in the later Roman period. The regularity of the plots within which the houses sit suggests some form of land allotment or enclosure. This area was occupied possibly throughout the 3rd and 4th centuries.

2.6 The evaluation revealed a ceramics assemblage which confirmed the local character of the majority of the pottery but with important regional elements including Nene Valley Colour coat and Gaulish Samian ware imported in the 1st century. Much of the remaining material culture was unexceptional with brick, kiln bars, querns stone, fired clay, iron slag and nails. These groups represent the normal range of activities familiar from Roman small towns, from pottery production to food production (Burnham, Wacher

1990, 46-50). The animal bone and charred plant remains indicate a diet perhaps dominated by beef (cattle at 60%) with sheep and goat bones comprising some 24% of the assemblage. Oats, wheat and barley were evident in the roadside ditches of Trench 87 whilst horse bones, likely to represent the remains of draught animals, comprised 13% of the bone assemblage.

2.7 No human remains were recovered from the trenches.

2.8 In summary the two areas of Roman activity retain significant evidence in the form of archaeological deposits relating to the 1st to 4th centuries. In relation to periodisation the later Iron Age pottery hints at the location elsewhere of an earlier settlement and that the street was first occupied in the pre-Flavian period[2] until at least the late 2nd century, when the flanking ditches may have been allowed to silt up. The earliest activity at the Unwin's site may have been quarrying alongside the road before any settlement activity occurred. Enclosures seem to have been established here after the quarry period from the late 1st century onwards and occupied into the 3rd century before the town began to contract in the 3rd and 4th centuries. This is a situation comparable that identified during David Neal's excavation along the route of the A5 (Neal 1987).

2.9 The evidential value of the area is, however, threatened and to some extent eroded by the illegal use of metal detectors evident during the evaluation in 2018 and experienced by the landowner.

2.10 In addition to the below ground archaeology both areas, Unwin's and Woburn, are characterised by ridge and furrow, the remains of medieval and possibly later ploughing.

Historical Value

2.11 The Unwin and Woburn areas of Roman archaeology are of historical value for a number of reasons, both illustrative and associative:

2.12 ***Illustrative***

2.13 The area is a common survival of archaeology peripheral to a small Roman town. It comprises the type of activities which might be expected of such areas, from the initial gravel quarrying through the construction and metalling of the street to the late 1st and 2nd century until the final ribbon-like development of enclosures and habitation. The

[2] Before 69AD

enclosures east of the brook, which flows through Unwin's, are an interesting example of settlement transition from urban periphery to rural landscape.

2.14 The small town of Magiovinium has long been considered to have its origins in a small fort, adjacent to the roundabout on the A5, which attracted settlement further north and close to Dropshort Farm. This developmental model is represented by the Scheduled Monument Area. The evidence at South Caldecott shows how the military dispositions of the early invasion period evolved into economic centres.

2.15 The evidence also suggests that the conclusions by Neal from his excavations in the late 1980s (Site 17) that a series of five deep fairly narrow north-south gullies *'indicates a certain uniformity. Most of the plots were about 19m wide and correspond to similar enclosures found at Towcester'* (Neal 1987, 9)[3] suggesting a planned settlement of land allotments. The line of the street found in Unwin's at South Caldecott continues the line of the road discovered by Neal (Site 18) where he argued the road led towards the main gate into Magiovinium, although its northern route was at that time uncertain. Possibly, he speculated, it may have led towards Harrold in Bedfordshire. The wayside ditches at Site 18 and to the south at Site 17 were allowed to silt up in the later 2nd century suggesting the street changed character during its period of use.

2.16 In summary the Roman archaeology a South Caldecott, Unwin's and Woburn, further illustrates aspects of the model proposed in the 1980 by Neal that the civil settlement at Magiovinium may have been a planned settlement beyond an earlier Roman fort. The dating from the evaluation suggest this may have taken place in the Pre-Flavian period (before 69AD). The model of economic development has ben taken further by Millett and endorsed recently by Allen et al., who have proposed that the later economic development of planned small towns was related to their function as locations for tax collection based perhaps on market centres and trade.[4]

2.17 The ridge and furrow at Unwin's and Woburn are part of a once wider area of similar earthworks. They are the remains of medieval and possibly later ploughing in the parish of Bow Brickhill. The ridge and furrow was first recorded by the Desk Based Assessment (MOLA 205 15/151) and it was illustrated in Fig 21 described as *'feint north-south-aligned earthworks'*.

[3]Deal D S 1987 Excavations at Magiovinium, Buckinghamshire, 1978-80 *Records of Buckinghamshire, 29, 1-115*
[4] Allen et al., 2017, 174-177, 237-80; Millett 1992, 123-6, 190-5

2.18 ***Associative***

2.19 The Roman remains have limited associative value in three ways. Firstly, it is an area of surviving, though truncated, Roman activity on the periphery of a small town. This dates from a period when the town was expanding. Its greatest extent was characterised in Neal's terms by ribbon development along a street leading to the core of the small town (the SAM).[5] Secondly, it is associated with a recognised period of decline in the 3rd and 4th centuries which appears to have affected some small towns in the south and Midlands. This occurred at the same time that some of the major urban sites were developing significant defences and experiencing a change in focus and function. Some towns during this period saw the enlargement and improvement of public buildings whilst others experienced growth led by economic factors such as the establishment of markets.

2.20 There is also some significance in that the evidence represents the periphery of a small town in an area which might be considered to be especially sensitive to a variety of factors such as economic growth, proximity to Watling Street, existing facilities and proximity to other centres of population and resources.

2.21 The ridge and furrow at Unwin's and Woburn represent small surviving areas of medieval earthworks from Bow Brickhill parish. The land use and resources available to a medieval township[6] comprise four main types, arable, meadow, woodland and waste (often referred to as heath or moor, fen). In the Midlands many townships were characterised by having some 90% arable land. This was divided into open fields and subject to crop rotation, often referred to as the three-field system. Ridge and furrow represents a cultivated ridge of land, a strip field or furlong, flanked by furrows for ease of identification and drainage. Evaluation in 2018 confirmed that some ridge and furrow survived as low earthworks in both Unwin's and Woburn.

2.22 Analysis of the ridge and furrow was carried out in 2001 when English Heritage[7] undertook a survey of ridge and furrow in parts of 9 counties which included Milton

[5] Official encouragement of settlements like Magiovinium and Towcester was described as a new model by Burham and Wacher in 1990 to distinguish it from the military, economically driven or developmental models, characterised by settlements (vici) outside Roman forts (Burnham and Wacher 1990, 9)
[6] The term township or vill was the basic economic unit in the countryside before the industrial revolution. It contained all the essential resources needed by an agricultural community. It contained all the essential resources needed by an agricultural community water supply, arable, pasture (had its own field system), meadow land, access to woodland for timber and fuel and a mill. It was the area occupied by a distinct community and is not to be confused with a manor (area of secular jurisdiction) or parish (area of religious practice served by a parish church supported by tithes), although these sometime occupy the same area.
[7] English Heritage 2001 *Turning the Plough Midland Open fields: landscape character and proposals for management*, Hall D

Keynes (Hall 2001, Fig 4). The English Heritage survey mapped and assessed the ridge and furrow in the whole of the South Midlands, East of Birmingham based on the extent of survival, and the quality of historic documentation within each township. Each township (of 1577) was scored on a four-point system based on:

- Poor: little or no ridge and furrow
- Fair: some ridge and furrow
- Good: fair quantity of ridge and furrow with vill and other associations
- Outstanding: a large area of ridge and furrow, usually with associations

2.23 From this assessment 140 townships were identified which had, by area, more than 18% survival of ridge and furrow.[8] This sample was examined county by county with each county archaeologist taking into account fragmentation, village earthworks, and other historic associations. From this sub-sample 43 townships in 40 civil parishes were identified as priority townships. No priority township were identified in the Milton Keynes area, though Passenham on the Northamptonshire border was included. The priority townships were identified based on scheduling criteria: group value, survival (extent), potential, documentation and condition.

2.24 In addition to this extensive survey, which did not identify the ridge and furrow of Bow Brickhill as significant, the development site has been evaluated by geophysical survey. The surveyors concluded that *"parallel linear anomalies relating to medieval and early post-medieval ridge and furrow cultivation are very widespread across the survey area. The furrows are typically spaced at 5m to 8m intervals, and often follow gentle reversed-S curves rather than running straight. They occur in coherent blocks (furlongs) the ends of which (headlands) are sometimes followed by modern field boundaries. The clearest anomalies occur in the southern pasture fields where the ridge and furrow is best preserved, still surviving as earthworks. Elsewhere the anomalies vary from weak to very weak. This variation will principally reflect broad scale variations in the magnetism of the ploughsoil and subsoil, although the degree of truncation by later ploughing may also be a factor".*

2.25 There is no available quantification of the extent to which the ridge and furrow survives as earthworks in the parish. Bow Brickhill was excluded from the priority townships of the Turning the Plough project (Hall 2001) as it had less than 18% survival.

[8] Shipston on Stour was not included in the sample (information from John Robinson Warwickshire HER 22/5/15

Aesthetic value

2.26 The Roman archaeology and the earthworks of the medieval ridge and furrow at the South Caldecott site has little aesthetic value in its current form, as it is private agricultural land adjacent to the A5. It is effectively hidden from public view and has not been the focus of research until the present round of evaluation.

2.27 **Communal value**

2.28 The archaeology of Magiovinium as a whole has some communal significance. The site is a focus of interest for the public. It is cited by the Council in the Core Strategy (2013) when characterising the historic environment (para 15.3) and similarly in the MK Proposed Submission Plan 2017 para 19.9. In the community the Buckinghamshire Archaeological Society has been the principal source of articles on excavations at the Roman small town and the small town is cited in the UK & European Metal detecting Forum and a focus for the Milton Keyes Metal Detecting Club.

2.29 There is currently no public access and the site lies adjacent to a heavily used modern A road (A5 dual carriageway). Understandably there is nothing on site to inform passers-by of the history or function of the site.

2.30 **Status**

2.31 The Roman archaeology in both Unwin's and Woburn has no formal status though it may be considered to be within the setting of the Scheduled Ancient Monument to the west. The scheduled monument cannot be seen from the South Caldecott site which lies east of the A5 in locations (Unwin's and Woburn) where the road carriageway and hedging block any line of sight. However, the site can be experienced as part of the SAM due to the results of the recent geophysical survey and trial trenching as well as an awareness of Neal's excavations in the late 1980s.

2.32 When assessed against the criteria used in scheduling, group value, survival (extent), potential, documentation and condition the Roman period archaeology is significant. It has value as part of the Roman small town (group value) and has a high level of survival though it is not waterlogged and the upper horizons have been eroded by medieval ploughing. Its potential when assessed on a scale of high, moderate or low, is moderate as demonstrated by the depth of stratigraphy and range of artefactual and environmental data. The condition of the archaeology similarly when assessed in terms of high, moderate or low is moderate. It does not survive as above ground earthworks,

it is not waterlogged and the early plough erosion has resulted in the removal of any historic surfaces such as floors or working areas.

2.33 The extent, character and relationship of the Roman archaeology to Magiovinium suggests that it is important archaeology though not of schedulable quality.

2.34 The earthwork remains of ridge and furrow are similarly non-designated. They comprise a small surviving proportion of a much larger area of such earthworks and consequently they have only low value in terms of group value; their survival over a small area is high, but their extent is low, their potential to illuminate more than a restricted range of site formation processes is limited. Their significance is therefore moderate to low.

2.35 **Summary**

2.36 The significance of the archaeological deposits in at Unwin's and Woburn has been assessed above and found to be moderate. The Roman period archaeology evidence of 1st to 4th century development on the periphery of a Roman small town capable of the informing the Research Frameworks[9] objectives in relation to crafts trade and industries (12.11) and settlement (12.6). In addition research objectives for the east counties are relevant with respect to informing the development of small towns in relation to changes in their internal layouts and housing densities, role as centres of supply and demand; character of late Roman towns in the region, the morphology of small towns.[10] To the research objectives of the eastern counties could be added the research objectives of the East Midlands[11] 5B Dissemination, 5e Diet and Health 5G Secondary Urban Centres and making a minor contribution to 5H Landscape Context. The ridge and furrow is of lesser significance with the potential to contribute in a minor way to Research Objective 7I Development of the Open Field System. It is the retention of this potential and the elements of the archaeology's significance, set out above, comprise the values which the WSC is intended to retain.

[9] Fulford 2014, 179-184 in Hey and Hind 2014,
[10] Medleycott 2011, 47-48
[11] Knight et al 2012, as updated by https://archaeologydataservice.ac.uk/researchframeworks/eastmidlands/wiki/

3.0 SUMMARY CONDITION REPORT

Introduction

3.1 In accordance with the staged approach to the preservation of archaeological remains set out by Williams (2016, 7) Section 3 draws on the input from relevant specialists as well as the sampling of materials and deposits undertaken as part of the regular assessment of potential (Burke/MOLA 2018). Archaeological deposits and artefacts are sensitive to change and this section provides a summary of the baseline condition of the deposits at South Caldecott in order to fully understand the impacts that development may have on current burial conditions and the site's significance.

3.2 Key materials, in particular environmental remains, such as charred plant or seed remains, have been sampled and these provide an indication of below ground conditions. In addition to the data derived from the recent trial trenching consideration is also given to the results of the Ground Investigation by BWB (BWB 2019) and to the results of Neal's earlier excavations along the line of the A5 (Neal 1987).

Topography, geology and previous archaeology

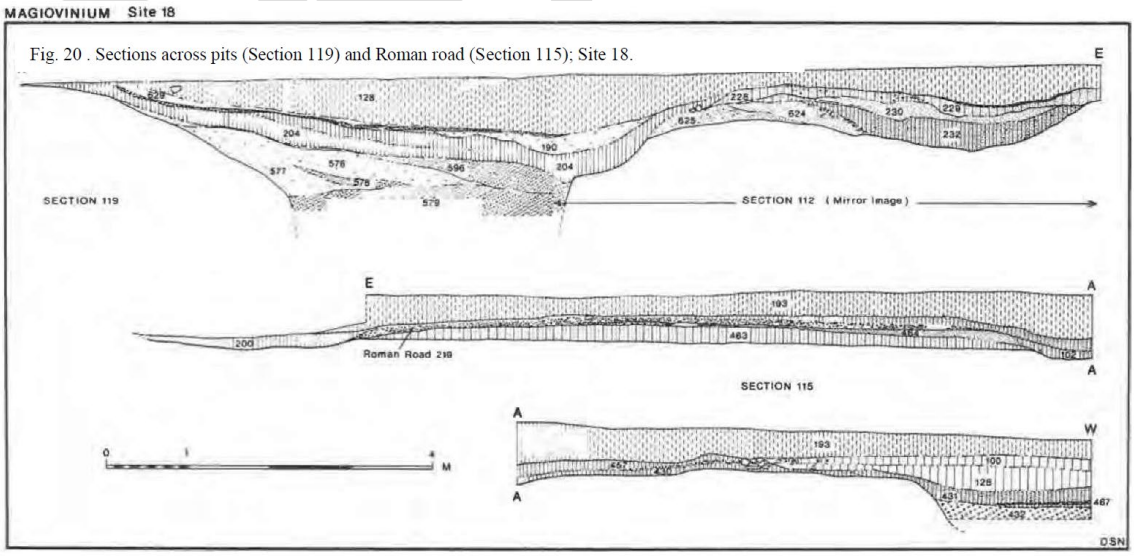
3.3 The archaeology at Unwin's and Woburn, Milton Keynes, is situated in pasture fields with a total extent of some 11.748ha. The principal deposits occupy two areas. In the north a roughly triangular space between the A5 and a small tributary stream of the river Ouzel (BM249231, 239493- Unwin's) and in the south a small sub-rectangular area (BM288801- Woburn). The archaeology lies at some 68m above Ordnance Datum (68.59- AOD) and occupies almost level ground on the east side of the side of the wider River Ouzel valley.

3.4 This is a gently rolling agricultural landscape where the solid geology comprises Jurassic mudstone formations, predominantly of Oxford Clay (OCF) which is overlain by the West Walton formation in the southeast. In the areas of interest to this report this solid geology is covered in part by discrete drift deposits of river terrace gravels (RTF) in the west, towards the River Ouzel, and heads of sands or gravels across the west and centre (BGS 2018). The archaeology in Unwin's and Woburn lies in areas of river terrace gravels. The ground investigation (BWB 2019, Boreholes 04, 05, 06, 08) record the depth of the gravel deposits varies: 2.6m below ground level (bgl) (BH04); 3.7m (BH05); 2.5m BH06) and 2.1 (BH08) all lying above the Oxford Clay.

3.5 The role of the tributary is important in relation to the archaeology as a possible indicator of any potential waterlogging. The tributary flows from east to west, and feeds into the River Ouzel approximately 90m west of the development site. A very small section close to the archaeology has been assigned a low flood rating (greater than 1 in 1000 but less than 1 in 100 chance of flooding in any given year) in relation to flooding from rivers and the sea, with a Zone 2 floodplain and medium flood rating located approximately 20m north and west of the site (BWB 2019, Phase 1, 8).

3.6 The data indicates the site is located within an area of superficial deposit flooding at the surface (groundwater flooding associated with shallow unconsolidated sedimentary aquifers overlying unproductive aquifers).

3.7 Groundwater strikes were noted by BWB in the Head deposits at depths of approximately 0.5m to 2.7m bgl. (BH04 2.6 Slow RTD; BH05 2.7 Slow HD; BH08 3.10). Seepages of water were also encountered within the Made Ground [archaeology], whilst post investigation groundwater monitoring confirms borehole BH06 was recorded as dry during all monitoring visits. (BWB 2019, 29). BWB noted in the Phase 2 report (2019, 7.31) that *"The stream flowing through the eastern[12] area of the site may be fed by groundwater flowing through granular horizons of the Head and River Terrace Deposits in this area. During inclement weather it is possible that localised inundation may be encountered."*



Section across the Roman Street (Area 18) published by Neal in 1987

[12] This is a misprint for western…

3.1 Previous archaeological investigations on the adjacent site by Neal in 1978-80 published in 1987 revealed a section of cobbled street co-terminus with the gravel metalled street revealed by the 2018 evaluation. The archaeology, including sections dug across the route of the A5, revealed a traditional archaeology of street surface, 4 cremations, pits and the remains of a quarry. Among the "*2.8 kg of soil samples recovered from Site 18 were two basic types—smithing and fuel ash slags, often dribbles. There was a hearth bottom (No. 496) 10.5 cm in diameter. Among the small finds related to this activity was an iron object (Fig. 28, No. 104) identified as an unfinished hammer-adze. It was found in the upper levels of a filled-in quarry, located at 0.575m east by 12 m north"*. No environmental evidence was recovered from this area.

3.2 Area 17, adjacent to Woburn (land parcel BM288801), although excavated in very wet conditions revealed no evidence of waterlogging. These excavations revealed 6 phases of activity from (1) Preconquest fields, (2) fort building to the west, (3) re-alignment of Watling Street to avoid the fort, (4) new field systems possibly aligned on the road and fort, (5) roadside ditches filled in and surmounted by metal working, (6) clearance and levelling to allow for buildings and industrial activity followed by further clearance and the creation of a cemetery.

On site Preservation Assessment

3.3 The evidence of the evaluation has been presented in the report by Burke/MOLA 2018 and reviewed above for the Statement of Significance. The following reviews the evidence of preservation. The archaeology in both land parcels Unwin's and Woburn, is preserved beneath topsoil in areas where ridge and furrow earthworks survive. Excavation revealed that archaeological evidence survived beneath topsoil horizons which varied between 500mm in depth in locations where medieval ridges survived to 300mm in areas of furrowing. The majority of archaeological deposits were found to survive within an upper band down to 1.5m bgl. Some pits of over 1.5m were recorded though not fully excavated (Burke 2019, Fig 12) and there was evidence of gravel quarrying. The deeper pits are comparable with Neal's quarry pit (Neal 1987, Section 119, fill (579)) [see above].

3.4 The majority of small finds came from trenches 85-88 and 91 which yielded copper alloy, iron and lead. There was no excessive corrosion to indicate waterlogging. Eight 40lt soil samples were taken from archaeological features which appeared to have the potential to yield organic remains. However, with the exception of the charred plant

remains, no evidence was recovered of waterlogged preservation. Amongst the environmental samples charred plan remains were *'well preserved…and the assemblage comprises important cereal crop, including wheat, barley and oats, all associated with charcoal concentrations'.*

3.5 In addition to the finds and environmental data a large assemblage of animal bone was recovered (1551 fragments) of which the majority was recovered from trenches 85-88 and 91. Examination of hit assemblage revealed no indication of waterlogging.

3.6 In summary the material from both Unwin's and Woburn conform to the profile of finds expected from a buried, well drained rather than waterlogged environment (Williams 2016, Fig 2 based on Retallack 1984).

3.7 **Post-Fieldwork Review**

3.8 The evidence above suggest that the below ground archaeological deposits have the potential to survive in situ. Their relative stability is indicated by the range of materials found, the nature of the surface geology and the indication of a stable though not waterlogged environment. The survival of artefacts from the Pre-Flavian period to the present day (before 69AD to 2019) indicates the level of stability. At present there is no indication that with the maintenance of the status quo the burial conditions will deteriorate and that existing rates of decay and corrosion of artefacts will accelerate.

4.0 IDENTIFYING IMPACTS OF DEVELOPMENT

Development Proposals

4.1 The allocation site comprises 52ha agricultural land. Archaeological deposits in Unwin's and Woburn proposed for preservation in situ extend over some 10.748ha. The significance of the archaeology, its character and the burial conditions have been assessed above and the stable nature of the deposits noted. The proposed development is for *"Development of up to 227,000 m2 of Storage, Distribution buildings (B8), with ancillary offices (B1 (a)), car and HGV parking areas, a new primary access off Brickhill Street, with earthworks, drainage and attenuation features and other associated infrastructure" (DAS 2019, 1.3, page 4)*.

4.2 Construction Impacts

4.3 Three construction impacts can be identified from the Design and Access Statement:

4.4 (1) re-direction of the watercourse (DAS 2019, 4.11);

4.5 (2) Zone 1, a new roundabout access/egress point spurs, a plot development of 8.1Ha which could hold a large floor plate building for B8 and ancillary B1 uses with a maximum GIA of 48,000m2, and a maximum height to eaves of 18m with a finished floor level of circa ??m AOD and Zone 2, to the North West of the site and bounded by the A5, the railway line and the internal spine road. This leaves a plot development of 20.8h which could hold a large floor plate buildings for B8 and ancillary B1 uses with a maximum GIA of 112,000m2 split into three plots, and a maximum height to eaves of 15-18m with finished floor level of circa ??m AOD,??m AOD and ??m AOD;

4.6 (3) Attenuation pond (D & A 2019, Fig 7.3) are major landscape features and their treatment has an important influence on the character of the completed development. The pond would have seasonal inundation of water and would be wet throughout most of the winter and dry in the summer.

4.7 In addition to these broad impacts the ground investigation report (BWB 2019 Phase 2, Sec Geotechnical Report) has indicated the geotechnical constraints to the development proposals in the area of Units 1 & 2. BWB note that:

(7.2) "..ground conditions recorded on site typically comprised of Topsoil/Made Ground overlying superficial River Terrace Deposits (RTD) at the west part of the site (Unwin's),

Head Deposits in the south-eastern portion of the site (Woburn)…" and *"It is deemed that Topsoil will be removed prior to commencement of any specific earthworks, and as such is not included within the ground model for any of the plots.."*

(7.3) in "…the western area where RTD deposits (north west area beneath Units 2 and 3) and Head (south western area beneath proposed unit 1) are present. Head deposits are unlikely to be a suitable founding stratum for the type and size of development proposed due to their variable and limited thickness limiting the potential for founding in a single strata type. The RTD are typically overlain by a thin cohesive layer, which is also considered to be an unsuitable founding stratum".

4.8 In detail BWB noted that:

(7.4) Based on the proposed cut and fill plan, Drawing Ref. SCD-BWB-DGT-XX-DR-D-600, dated 18/05/2018 (Drawing 2), the proposed enabling works are summarised below:

Unit 1: Cut of up to 1.8m in the southern area and fill of up to 1.8m in the northern area.

Unit 2: Positioned in an area of fill ranging between 1.4m in the south of the plot to 3.0m in the north-western area.

4.9 BWB (7.9) note that

"For Units 1, 2 and 3, the current building footprints will be within significant areas of cut (up to 1.8m) and fill (up to 3.0m). Due to the variable fill thickness across the footprints of these units a shallow spread foundation solution on natural ground is unlikely to be a viable option due to the potential for significant differential settlement within different strata types or variable thicknesses of fill".

4.10 In table 7-2 BWB summarised the ground conditions in relation to foundation design as follows for Units 1 and 2 in Unwin's and Woburn:

4.11 **Unit 1** - Up to 1.8m of Fill in the north; Firm OCF formation at ~2.0m bgl following cut in the south. Due to the potential total and differential settlement, a vibro solution densifying the fill, Head Deposits and upper OCF is likely to be the most suitable option allowing shallow footings to be adopted. Alternatively, a piled solution should be considered.

Unit 2 Fill at ~1.0m. This is over River Terrace Deposits of circa 2.0m thick, in turn over the OCF. Due to the potential for excessive total settlement, a vibro solution densifying the fill, River Terrace Deposits and upper OCF is likely to be the most suitable option allowing shallow footings to be adopted. Alternatively, a piled solution should be considered.

Archaeological Impacts

4.12 The constraints identified by BWB indicate the following, potential, archaeological impacts.

- Vibro compaction of the RTD (in which the Roman street is located)
- Removal of topsoil (medieval earthworks of ridge and furrow)
- Pile foundations (through the Roman period archaeology).
- Diversion route of the tributary stream

4.13 In each case the preservation of archaeology is compromised. The removal of topsoil by excavation for construction or landscaping removes any protection that the soil provides to deposits buried below. Nor is impact limited to the soil removal but to the effect of plant movements on below ground deposits.

4.14 Piling causes impacts not only in relation to the pile itself but up to four times the area of the pile. The effect of pile clusters can, in addition, make access to the areas within the clusters inaccessible to later investigation (Hughes et al., 2004, 98-112; Hyde 2004, 32-39).

4.15 Hydrological impacts have the potential to cause considerable harm to otherwise stable environments (Williams 2016 19-21) and although neither of the areas, Unwin's or Woburn, have evidence of waterlogging the change to below ground water flows will inevitably affect the preservation state of the archaeology.

4.16 The final impact is the excavation of a channel or culvert for the tributary stream, diverting it away from the development site to run alongside the A5. The results of the 2018 evaluation and the 1980s excavation by Neal indicate that in order to maintain the flow of the stream course along the diversion route (easement) excavation will be necessary. This will achieve preservation by record and could be the subject of a separate WSI.

4.17 In summary, the most significant impacts of development are due to the topography of the site. This requires levelling to create sufficiently large building platforms to ensure the economic viability of the site; re-direction of the watercourse to ensure adequate drainage; provision of new drainage to serve the proposed new building platforms and the creation of new water bodies

5.0 METHODOLOGIES

Introduction

5.1 Mitigation of the effects of development can take several forms and NPPF (2019), para 192, notes that when determining planning application, local planning authorities should take account of the *'the desirability of sustaining and enhancing the significance of heritage assets and putting them to viable uses consistent with their conservation'.*

5.2 The aim of is mitigation is to ensure that appropriate environmental conditions for long term survival remain in place during and after development. Evidently there are two main methods of reducing harm to the significance of archaeology. The first is avoid it by planning areas, such as set-aside or public open space, in locations where archaeology is at risk. Alternatively, an engineered solution might be designed which allows development to go-ahead without impact on below ground deposits. The nature of engineering operations has been described above and BWB have identified the geotechnical parameters for the design of engineering solutions for the development (BWB Phase 2, Sec Geotechnical Report).

5.3 Williams (2016) notes that detailed mitigation approaches are provided by Davis et al., (2004, Chap4) in a volume which provides examples of engineering strategies (4.3). These are defined as *'active measures which reduce the impact of engineering operations on the ground containing the archaeological remains'* (Davies et al., 2004, 36).

5.4 At South Caldecott the archaeology comprises medieval earthworks and below ground Roman remains on the periphery of the Roman small town of Magiovinium. The archaeology has been identified as a non-designated heritage asset, part of the wider remains of the Roman small town of Magiovinium together with the remains of ridge and furrow earthworks in the parish of Bow Brickhill. The archaeology lies in an area of RTD and head deposits. BWB have identified this as an area where the topography indicates that *"For Units 1, 2 and 3, the current building footprints will be within significant areas of cut (up to 1.8m) and fill (up to 3.0m). Due to the variable fill thickness across the footprints of these units a shallow spread foundation solution on natural ground is unlikely to be a viable option due to the potential for significant differential settlement within different strata types or variable thicknesses of fill."*

5.5 The dichotomy between geotechnical constraints and archaeological significance indicates that the only viable mitigation strategy is a Covering System (Davis et al 2004, 4.3.4). This is defined as a method *"to isolate the archaeological remains from the construction activities and to contain them within or below an engineered covering regime. The aim of this approach is to actively maintain the burial environment conditions thought to be responsible for the in situ preservation of the remains, while still permitting development at ground level."*

5.6 **Approaches to Preservation In Situ**

5.7 Covering Systems have been used in several projects of which the most well known in the UK are the Rose Theatre, London, Globe Theatre, London and Flag Fen, Peterborough (Davis et al., 2004, App D). In addition there are less well known examples Brighton and Hove - Peacehaven Waste Water Treatment Works (16/9/09), Great Western Park, Didcot (over a Roman villa) and Thanet Earth (all RPS/CgMs projects).

5.8 In setting out an approach to Covering Systems Davis et al., have identified the following sequence:

- Existing soil is left in situ and engineering techniques are confined to a level above ground surface
- Construction activities will cover the archaeology (an avoidance strategy) for example by hardstanding, landscaping or foundation elements placed on top of or suspended above.
- Where possible construction activities will be located away from the archaeology informed by the results of archaeological evaluation.
- Construction activities should be confined within areas that are devoid of archaeology
- If construction activities are to be located above in situ remains a material could be introduced to act as a buffer in place of or addition to archaeologically devoid surface material. The new material effectively isolates in situ archaeological remains.

5.9 The geotechnical parameters of the construction activities at Unwin's and Woburn have been specified by BWB (see above and BWB 2019, Phase 2. Sec 7 [7.9-7.25]). The recommendations for Units 1 and 2 can be summarised as:

(1) Vibro-replacement results in the densification of granular soils and the overall strengthening of cohesive soils by introduction of compacted stone columns, which results in enhanced bearing pressures and a reduction in settlement.

(2) The presence of Made Ground at the site, underlain by the increasingly competent bedrock geology of the OCF, indicates that a piled foundation solution may be viable for the larger units proposed, however give the likely cost associated with such a solution it is anticipated that a ground improvement option would be most cost effective.

5.10 The recommendations of the BWB report are that *"…that, once the earthworks strategy has been finalised and a better understanding of development plans are known, an earthworks specification be undertaken to assess the most economical foundation solution for each plot"* (BWB 2019, Phase 2, iv & 7.5).

5.11 **Archaeological Impact - Parameters**

5.12 The extent, character and survival of the archaeology has been mapped by MOLA through trial trenching and geophysical survey and confirms the pattern established in the 1980s as a result of excavation along the A5 by D S Neal.

5.13 Experimental work by Historic England and Cranfield University has identified a series of parameters which, in relation to weight, form a specification for the burial of archaeology beneath a buffer layer in situations where inert material has been placed above known archaeology (Soil Stack Project) and where there is repetitive plant movement (Soil Cultivation Practices).

5.14 The potential impact on below ground archaeology at Unwin's and Woburn is threefold (1) changes to the ground water (2) introduction of a buffer and (3) plant movements associated with construction activities. The introduction of a buffer introduces an increased loading to the ground surface and, therefore, the possibility of compression damage, whilst a change in land use from grazing to commercial unit raises the potential of ground disturbance.

5.15 In 2009 DEFRA and English Heritage (now Historic England)[13] undertook trials to test the impact of arable agricultural practice on below ground archaeology. An objective of this study was an 'Assessment of the effectiveness and viability of minimal cultivation, and differing soil management techniques, in preserving the archaeological resource and to compare these techniques with conventional arable/soil management systems'. Whilst the focus of the research was the effect of cultivation on archaeological deposits (sites) one area of research *'Sub-soil pressures resulting from tillage implements and vehicle loads'* is relevant to the proposed construction activities.

5.16 The trials were carried out in respect to tillage and farm machinery rather than earth moving plant. Although the implements tested were not directly comparable to earth moving equipment, the conclusions of the initial test are a useful indicator of potential impact: "None of the implements tested in the soil bin exerted pressure at 0.25 m depth higher than 0.3 bar, with the press and heavy roller exerting the highest pressure and the drill and light discs exerting the lowest at less than 0.05 bar. The roll, chisel tine, plough, root share, a human, drill tines and light discs resulted in intermediate sub-soil pressures". The tyre and track peak pressures were recorded at 0.25m and the researchers observed that "The peak pressures generally increase with the severity of the expected loading, in that pressures under the human are between 0.00 and 0.01 bar, increasing to 0.04-0.08 bar under the terra tyre, up to 0.09 bar under the single tractor tyre, to 0.16-0.38 bar under the Fendt tractor + raised subsoiler and up to 0.44 bar below the MF390 tractor pulling the trailer…. The above data enable identification of those operations where archaeological damage could occur, once the threshold values have been identified…"

5.17 *"Experiments, which followed with modern terracotta pots buried at 0.25 m at different orientations showed that the lowest breaking peak subsurface pressures were:*

- *1.1 bar for horizontally-orientated pots*
- *1.9 bar for 45-degree-orientated pots*
- *2.2 bar for vertically-orientated pots*

5.18 *The replica pots broke as follows:*

[13] Oxford Archaeology & Cranfield Univ 2009 *Trials to Identify Soil Cultivation Practices to Minimise the Impact on Archaeological Sites (Defra project No: BD1705) Effects of Arable Cultivation on Archaeology (EH Project number 3874) Known collectively as: 'Trials',* Oxford 2009

- *the shell-tempered pot was the weakest, failing at 1.3 bar*
- *the grog-tempered pot is second-weakest, failing at 1.6 bar*
- *the flint-tempered pot is the third-weakest, failing at 3.1 bar*
- *the sand-tempered pot is the strongest, failing at 3.6 bar*

5.19 *The rims of all pots failed at slightly lower pressures than their bodies. The lowest peak subsurface pressure at which the bone broke was 2.8 bar. It is expected that smaller, less robust bones and vulnerable pieces such as skulls would break at lower pressures."*

5.20 The researchers concluded[14] that *"The determinative result extracted from the pot breakage data in the study on the replica pots was the lowest breakage point of 1.3 bar (1.1 bar for modern, more brittle pots) and 2.8 bar for bone. This provides a reference point to pot breakage indicating the 'worst case scenario' for the most fragile pots."*

5.21 The relevance of this experimental work for the proposed development at Unwin's and Woburn is that the reference point for pottery breakage provides a bench mark against which to assess the impact of plant movements on below ground archaeology at depths beyond 0.25m (conventionally the depth of a shallow topsoil). In this case the data appears to show that at 0.25m none of the implements tested produced an impact greater than 0.3 bar and that this pressure was below that likely to damage below ground artefacts (pottery and bone) at 0.25m or deeper. The trial trench evaluation established the depth of the topsoil/subsoil in Unwin's and Woburn at between 200 and 500mm.[15]

5.22 The depths recorded by the MOLA evaluation (Burke 2019, Fig 12), combined with the experimental data of the DEFRA study suggest that any potential archaeological deposits within the proposed development lie below the threshold at which *agricultural* equipment running on the surface might damage archaeological deposits.

5.23 A second experiment carried out by English Heritage, the Soil Stack project[16] looked at the effects of weight, plant movement and compression resulting from the temporary storage of topsoil during the A1 Improvement Scheme. The evidence collected included

[14] Oxford Archaeology & Cranfield Univ 2009 *Trials to Identify Soil Cultivation Practices to Minimise the Impact on Archaeological Sites (Defra project No: BD1705) Effects of Arable Cultivation on Archaeology (EH Project number 3874) Known collectively as: 'Trials',* Oxford 2009 (Rev. 05/09) Page 9 of 25
[15] Pamment S, 2016, *Cotswold Farm Park, Guiting Power, Gloucestershire, Archaeological Evaluation*, Rubicon Archaeology
[16] Developing Methodologies, The Soil Stack Project, *Research News, Newsletter of English heritage's Research Departmen*t, 3 2006, 14-15

the effects of soil deposition and removal as well as the effect of plant movements to deliver and contour the stored topsoil. The data was collected over 2 years from 2003 to 2005. The archaeology revealed by evaluation was re-buried beneath 200mm of topsoil by mechanical excavator, further soil was spread by bulldozer until a depth of 300mm had been reached. In the final stage soil was imported in 150mm spits and levelled by self-propelled vibratory roller until a height of 8.9m was reached. Re-examination of the archaeological deposits took place one month after the removal of the soil stack. *'Three potential effects of compression had been anticipated; movement of the deposits, alteration of the relationship between contexts (soft deposits coming adrift from walls and revetments) and fragmentation of finds and environmental remains.'* Illustration of the work shows the removal undertaken by 20 ton Hymac earth excavator situated on top of the soil stack.

5.24 The result of the work of the Soil Stack project was that *'none of the three effects could be significantly measured'*. However, there was evidence of slight movement (0.024m to 0.079m) of stones. This was attributed to the re-burial process, with no damage recorded to charcoal and charred plant remains.

5.25 Both research projects provide an indication of useful bench marks for the construction activities at Unwin's and Woburn. The Soilstack Project in particular indicates that the use of plant to construct the buffer itself can safely be employed above the topsoil horizon without damage to the below ground archaeology. In the Methodologies Section which follows recording of the ridge and furrow, the creation of the buffer zone and the specification for the engineering solution to construction above the buffer are set out.

5.26 **Method Statement for Preservation in Situ**

5.27 The dichotomy between the preservation in situ of archaeology and the construction of large commercial sheds at South Caldecott has been noted above. The parameters of foundation design have been noted by BWB (BWB2019 Phase 2 Sec 7) and the parameters of archaeological preservation in situ set out above. The objective of this WSC is the preservation of the heritage significance of the three elements of archaeology at Unwin's and Woburn. This can be achieved by recording the ridge and furrow in accordance with Historic England's Guidance for the recording of earthworks, protecting the buried archaeology beneath an inert material bund and an engineering design solution to ensure construction above the archaeology is achieved with the parameters identified by BWB. Recording the ridge and furrow will:

5.28 The creation of a buffer will ensure that archaeology is not compacted beyond its present state. At South Caldecott this approach combined with the results of the Soil Stack and DEFRA Research suggests that any archaeology, will remain materially unaffected beneath the buffer at depths (0.35m - 1.6m) comparable to those identified during the trial trench evaluation.

5.29 **Ridge and Furrow: Recording[17]**

5.30 **Methodology**

5.31 All recording work will be carried out in accordance with the Chartered Institute for Archaeologists (CIfA) Standard and Guidance for Archaeological Field Evaluation (2014b) and adhere to their Code of Conduct (2014a).

5.32 An accession/event number will be obtained from MKDC and used to identify all records and artefacts.

5.33 Desk based work specifically addressing the location, extent, and character of earthwork features in the proposed area will be undertaken. This will include:

- Documentary and cartographic analysis of the parish of Bow Brickhill including landscape mapping. The enclosure award is available for the parish.
- Topographic recording by drone/aerial photogrammetry*.
- Identification and incorporation of any Aerial Photographs of relevance following data searches of Milton Keynes HER, Cambridge (CUCAP Library) and NMP Swindon.
- Integration of data including existing Magnetometry survey in a GIS.

5.34 Assessment will consider the level and extent of recent agricultural impact upon formerly preserved ridge and furrow earthworks, and attempt to distinguish eroded/destroyed ridge and furrow from those areas in which it was not established uncultivated areas (e.g. meadow/pasture).

5.35 A site visit to validate identified features

[17] This approach is based on similar projects in Northamptonshire and Leicestershire (Badcock Way, Fleckney)

5.36 Report detailing interpretation of phasing, identification and site formation processes where appropriate.

5.37 **Engineering Design: Preservation of the Roman deposit in situ**

5.38 The precise design of the engineered solution for construction above the archaeology is beyond the scope of this WSC. As BWB note (BWB 2019 Phase2 Sec 7.22-) A piled foundation solution would be potentially viable subject to the following:

- Soils generated from pile installation should be assessed in line with appropriate Duty of Care legislation and undergo waste classification prior to disposal;
- A fully warranted site-specific pile design should be undertaken by a specialist piling contractor, once loadings are confirmed; and
- A working platform designed in accordance with BRE470.

5.39 The creation of a buffer comprising inert material arising from the OCF removed from the eastern area if the site is based on a similar cover solution at *"Peacehaven WWTW – Installation and Removal of the Earthworks Storage Mounds over Undisturbed Material 2009"* where a Roman villa was preserved beneath a soil bund.

5.40 This Method Statement describes the procedure under taken by the contractor in order to achieve the installation without disturbing the underlying topsoil and any areas of archaeological interest beneath this topsoil.

5.41 SCOPE

5.42 Areas that have been identified as having no land raise or relocation of soils for enhancement will be left unstripped, as the preferred method of preserving archaeological information. Plate load testing will be undertaken (by RPS) in respect of archaeological deposits in the RTF to ensure that minimal impact occurs from the proposed overburden placement. The stockpiled material placed on these areas will need to be installed in such a manner that the virgin ground remains intact, and undisturbed during the deposition process. The following document describes these proposals.

5.43 GENERAL PRINCIPLES

5.44 Placement of materials stripped from the eastern areas of the site, where appropriate under Archaeological Strip and Map. Levelling of this stockpiled material in the final operation.

5.45 CONSTRAINTS

5.46 All operations to be undertaken to the satisfaction of the Council's Archaeologist and under supervision from Archaeological Contractor of RAO status. Any finds outside the unstripped areas may require 'chasing in' to these areas.

5.47 Weather shall be monitored to ensure placement, tracking over, and deposition will only be carried out during dryer periods.

5.48 SEQUENCE & PROCEDURES

5.49 Areas to remain unstripped are to be re-surveyed, or have the old ground level (OGL) information verified prior to buffer placement. This will facilitate the accurate location of this surface with the GPS enabled machines when final levelling is carried out.

5.50 Stockpiles of material stripped from other areas on site are to be placed, as normal, on the outside edges of the area. This will form a protective layer over the existing topsoil. It is anticipated that approximately 400mm will suffice for this first layer. This will be spread by a tracked low ground pressure (LGP) dozer, and will cause less impact to the strata than stripping operations undertaken on the remaining (South Caldecote) site in general.

5.51 Upon completion of this protective layer, the stockpiling can continue as normal, with low ground pressure dump trucks, and the LGP dozer forming the stockpiles.

5.52 ARISINGS

5.53 This will be carried out by the same plant, and a GPS equipped 360° excavator loading into the dump trucks as usual, outside the archaeological area in the first instance. When moving to the centre of the buffer, the excavator will ensure that the 400mm protection layer remains undisturbed. This will be controlled by the GPS equipment and by the Earthworks Surveyors.

5.54 This will ensure a protective layer over the entire area. Accuracy for this procedure will be approximately +/-15mm due to the computer controlled blades on the dozer, therefore this operation will cause no damage to any potential finds.

5.55 RESOURCES (for example)

5.56 Site Foreman

5.57 Operatives

5.58 1-2 No GPS enabled tracked low ground pressure dozer

5.59 1 No GPS enabled 35 tonne excavator

5.60 35 tonne articulated dump trucks with low ground pressure tyres (number to suit)

5.61 VRS GPS survey equipment

5.62 Surveyor

5.63 SAFETY

5.64 The work will be carried out by experienced operatives wearing appropriate safety equipment and will be supervised by competent foremen. All personnel working on the site will be equipped with the following PPE and the operation subject to the appropriate RAMS.

5.65 Gloves

5.66 Safety Helmet

5.67 Safety boots

5.68 Hi- Vis Vest

5.69 Eye protection where necessary.

5.70 Un-authorised personnel will be kept away from the works.

5.71 All drivers will be CPCS certified.

5.72 All operatives will receive appropriate P.P.E. and sign for it.

5.73 All operatives and site staff are to undergo an induction prior to commencement of works. This method statement and associated risk assessments are also to be communicated to them, and a record of the communication is to be kept in the site file.

5.74 RISK and HAZARD ASSESSMENT

5.75 Risk assessments will be carried out using information detailed in a Pre-Tender Health & Safety Plan, and obtained on site.

5.76 Environmental Statement and Risk Assessment. The intention is to ensure that the works undertaken have minimal effect on the environment. The works will therefore be undertaken with modern sound suppressed plant, utilizing low emission engines. The plant will be operated and maintained in accordance with the manufacturers recommendations.

5.77 The sequencing and methods of construction will be undertaken in conjunction with an environmental risk assessment and controls will be implemented to minimise any adverse effects. In particular controls will be implemented to control or minimise the following; -

5.78 Fuel or lubricant spillage.

5.79 Dust

5.80 Litter

Conclusion

5.81 In conclusion the site of the South Caldecott: Land South of Milton Keynes - Strategic Employment Allocation contains archaeology of moderate significance capable of addressing objectives identified by the three Research Frameworks which are relevant to the Milton Keynes area.[18] These include, for the Roman period, the economic and social character of the small town, periodisation and landscape context as well as aspect of material culture. The programme of recording in advance of drainage and water course diversion, recording of ridge and furrow and burial beneath a buffer layer has shown how the retention of this potential can be achieved. This programme should, however, be seen in the context of two further Written Schemes of Investigation (WSI): (1) A Written Scheme of Investigation for the recording, investigation, publication and archiving of archaeology along the route of the diverted brook and (2) the engineering design for construction above the buffer layer (as BWB 2019 Phase2 Sec 7.22-).

[18] As updated by https://archaeologydataservice.ac.uk/researchframeworks/eastmidlands/wiki/

5.82 The potential impact of development on the non-designated heritage assets at Unwin's and Woburn has been considered through the prism of design and development principles set out by Historic England. Development when seen in the light of these principles has been found to be less than substantially harmful in effect and not harmful for the purposes of the NPPF. Overall the conclusion of this assessment is that, subject to an adequate engineered solution to the above ground structures the impact of the Land South of Milton Keynes - Strategic Employment Allocation, will be less than substantially harmful for the purposes of the NPPF.

SOURCES CONSULTED

1. General

2. Internet

British Geological Survey – http://www.bgs.ac.uk/discoveringGeology/geologyOfBritain/viewer.html
British History Online – http://www.british-history.ac.uk/
Domesday Online – http://www.domesdaybook.co.uk/
Historic England: The National Heritage List for England –

3. Bibliographic

Allen M 2017 *The Rural Economy of Roman Britain*, London: Britannia Monograph 30

Burke J 2018 *Archaeological trial trench evaluation on land at South Caldecott Milton Keynes Buckinghamshire October 2018* (EMK 1365; AYBCM:2018.106)

Burnham B, Wacher J 1990 *The 'Small Towns' of Roman Britain,* London:Batsford

Chartered Institute for Archaeologists Standard & Guidance for Historic Environment Desk Based Assessment 2014, revised 2017

Davies M J et al., 2004 Mitigation of Construction Impact on Archaeological Remains, London: English Heritage

Department of Communities and Local Government *National Planning Policy Framework* 2019

Dodd A et al., 2014 Early Medieval Research Agenda, in Hey and hind 2014, 233-237

English Heritage (Historic England) 2006 Developing Methodologies, The Soil Stack Project, *Research News, Newsletter of English heritage's Research Department*, 3 2006, 14-15

Fulford M 2014 *Roman Period Research Agenda*, in Hey and hind 2014, 179-184

Glazebrook J 1997 *Research and archaeology: A framework for the Eastern Counties 1 Resource Assessment*, EAA Occ Papers 3

GPA 2 2015 *Managing Significance in Decision-Taking in the Historic Environment Historic Environment Good Practice Advice in Planning: 2* London Historic England

Hall D 2000 *Turning the Plough. Midland Open Fields: Landscape character and proposals for management*, Northampton: Northants CC & English heritage

Hey G, Hind J 2014 *Solent Thames Research Framework for the Historic Environment Resource Assessments and Research Agendas,* Oxford:Oxford Wessex Monograph No 6.

Historic England (formerly English Heritage) *Conservation Principles, Policies and Guidance for the Sustainable Management of the Historic Environment* 2008 (new draft 2017)

Historic England Historic Environment Good Practice Advice in Planning: 1 The Historic Environment in Local Plans July 2015

Historic England Historic Environment Good Practice Advice in Planning: 2 Managing Significance in Decision-Taking in the Historic Environment July 2015

Historic England Historic Environment Good Practice Advice in Planning: 3 The Setting of Heritage Assets December 2017

Kaiser A 2011 *Roman Urban Street Networks*, London:Routledge

Millet M 1992 The romanisation of Britain, An Essay in Archaeological Interpretation, Cambridge:CUP

Neal D S 1987 Excavations at Magiovinium, Buckinghamshire, 1978-80 *Records of Buckinghamshire, Vol 29 1987.*

Nixon T 2001 *Preserving Archaeological Remains in situ?* London: MOLA & English Heritage

Oxford Archaeology & Cranfield Univ 2009 *Trials to Identify Soil Cultivation Practices to Minimise the Impact on Archaeological Sites (Defra project No: BD1705) Effects of Arable Cultivation on Archaeology (EH Project number 3874) Known collectively as: 'Trials',* Oxford 2009

Williams T 2016 *Preserving Archaeological remains Decision Taking for Sites under Development,* London:Historic England

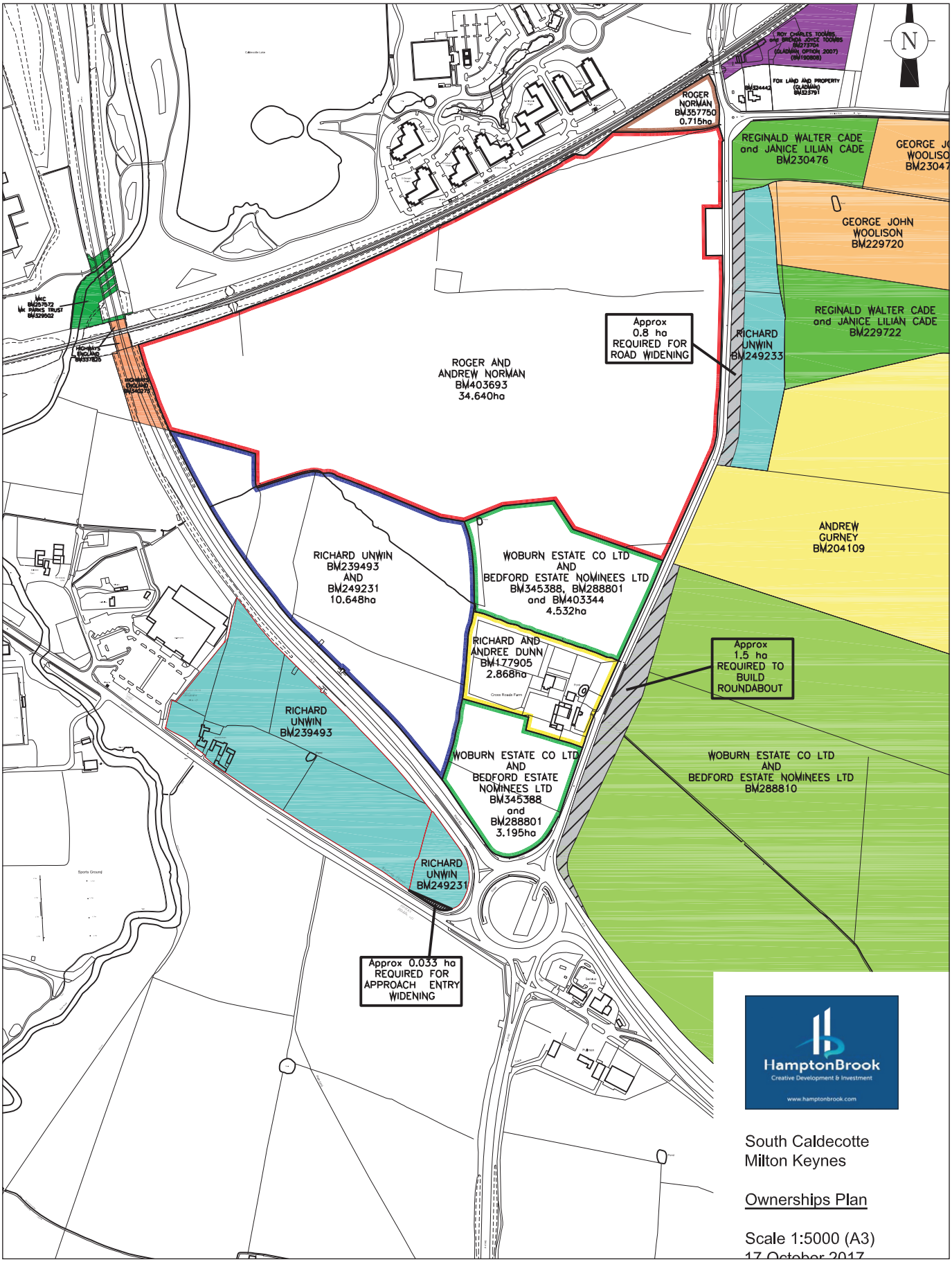


Fig 1 South Caldecott Ownership Plan

South Caldecott		
Not to scale Illustrative only		
Date printed: 16/3/19	Drawn by: MD Checked by:	

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Fig 2 Geophysical Survey

South Caldecott

Not to scale
Illustrative only

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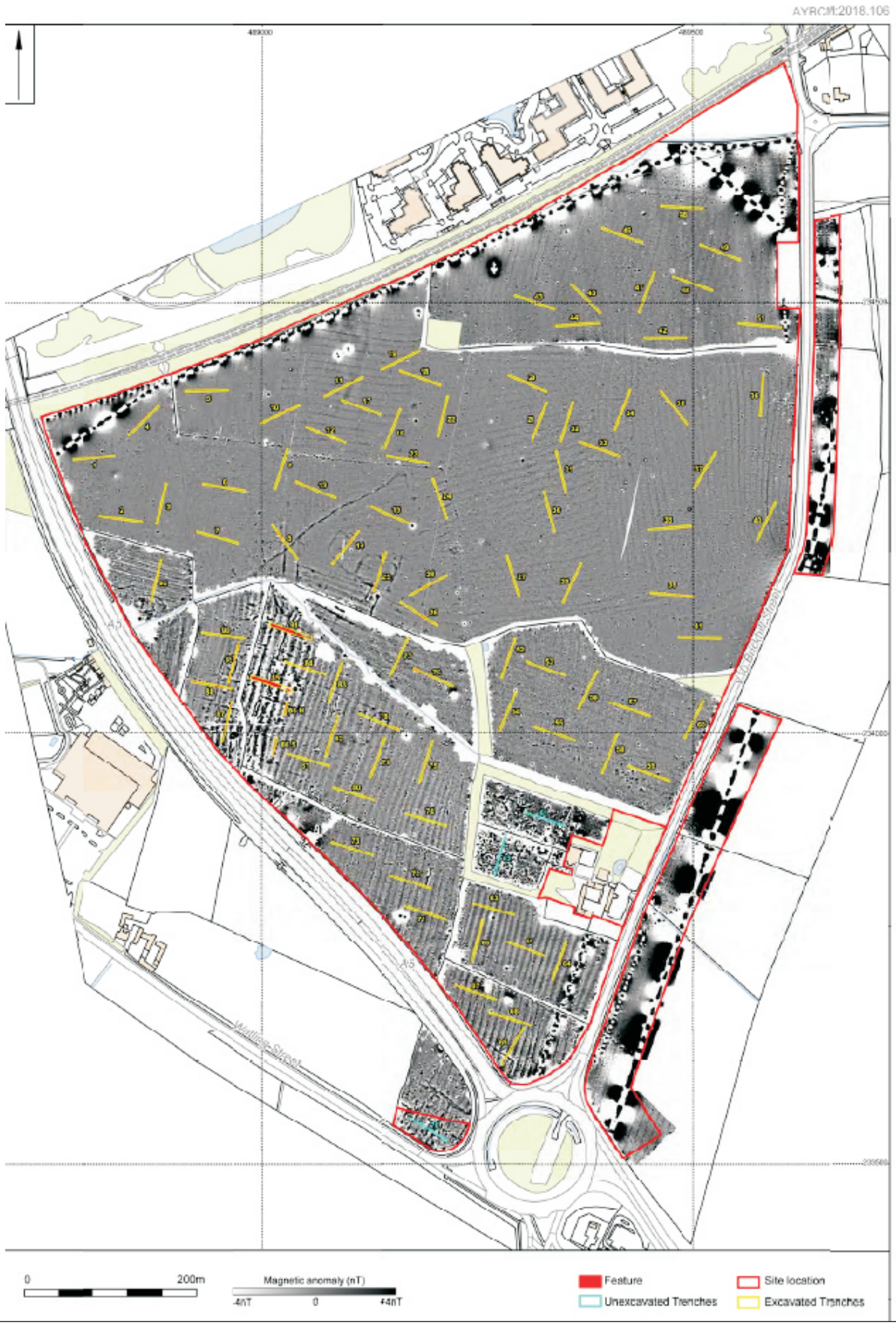

Fig 3 Trial trenches at South Caldecott overlying the geophysical survey

South Caldecott		
Not to scale Illustrative only		
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Fig 4 Archaeological evidence- DS Neal excavation of 1987, Geophysics 2018

South Caldecott	
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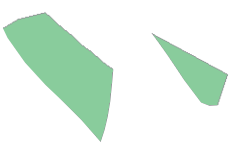
Fig 5 Areas of proposed buffer above archaeology



South Caldecott		
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Fig 6 Upper - Ridge and furrow in 2007 (google Ertah)
Lower - Thrench through the riudge and furrow

South Caldecott		
Not to scale Illustrative only		
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APPENDIX ONE: National Heritage List Entry for Magiovinium SAM

Roman town of Magiovinium and Roman fort

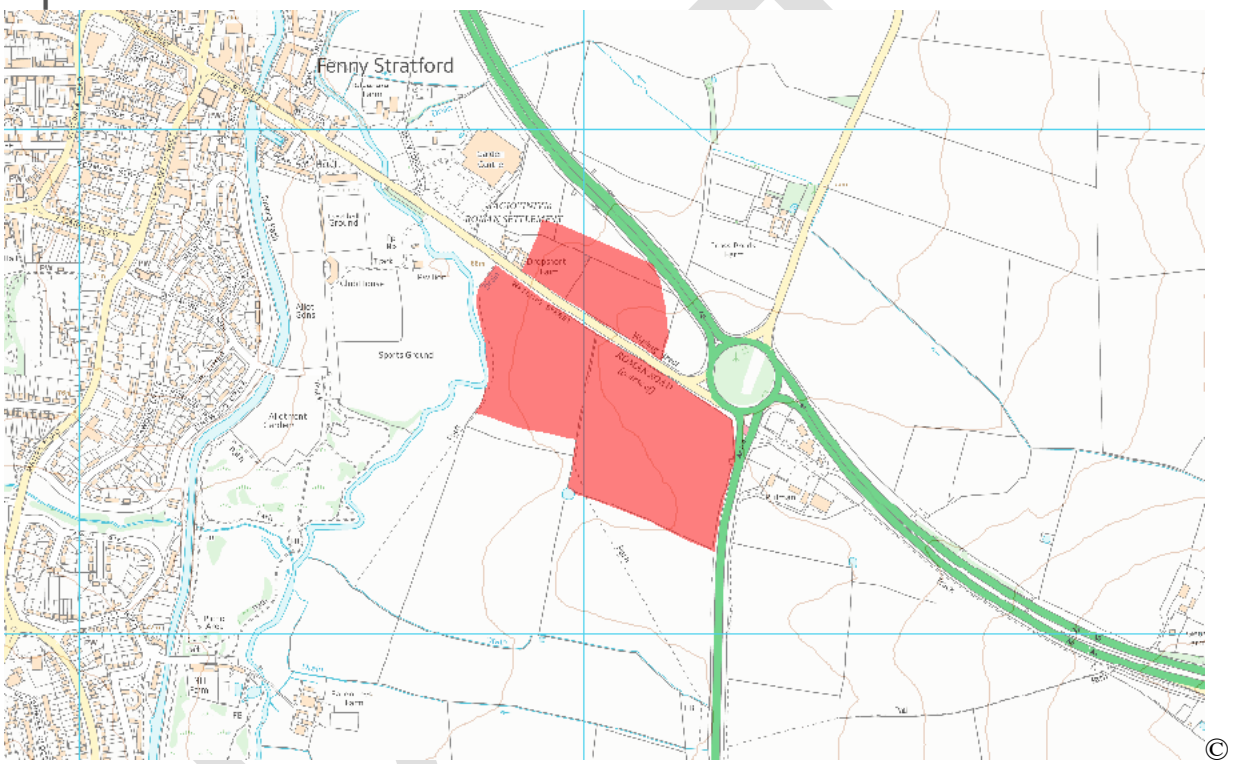
Be the first to contribute

Overview

Heritage Category: Scheduled Monument

List Entry Number: 1006943

Map



The above map is for quick reference purposes only and may not be to scale. For a copy of the full scale map, please see the attached PDF - 1006943 .pdf

The PDF will be generated from our live systems and may take a few minutes to download depending on how busy our servers are. We apologise for this delay.

This copy shows the entry on 18-Jan-2019 at 17:04:25.

Location

The building or site itself may lie within the boundary of more than one authority.

District: Milton Keynes (Unitary Authority)

Parish: Bletchley and Fenny Stratford

District: Milton Keynes (Unitary Authority)

Parish: Bow Brickhill

National Grid Reference: SP 89018 33707, SP 89039 33424

History

Not currently available for this entry.

Details

This record has been generated from an "old county number" (OCN) scheduling record. These are monuments that were not reviewed under the Monuments Protection Programme and are some of our oldest designation records. As such they do not yet have the full descriptions of their modernised counterparts available. Please contact us if you would like further information.

Legacy

The contents of this record have been generated from a legacy data system.

Legacy System number: MK 82

Legacy System: RSM - OCN

Legal

This monument is scheduled under the Ancient Monuments and Archaeological Areas Act 1979 as amended as it appears to the Secretary of State to be of national importance. This entry is a copy, the original is held by the Department for Digital, Culture, Media and Sport.

End of official listing

CgMs

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