

# 10 Stephen Road Headington Oxford



## Archaeological Evaluation and Watching Brief Report



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## **10 Stephen Road, Headington, Oxford**

### *Archaeological Evaluation and Watching Brief Report*

*Written by Helen Webb*

*with illustrations by Georgina Slater and Julia Collins*

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## Summary

*Between November 2011 and May 2013 Oxford Archaeology carried out an archaeological evaluation and watching brief at 10 Stephen Road, Headington, Oxford. The works were carried out in advance of and during a redevelopment for housing, comprising four town houses and a block of four apartments, with associated parking plots and gardens.*

*Prior to the development works, two evaluation trenches were excavated. These were located in areas identified as 'anomalies', possibly pertaining to burials, in a Ground Penetrating Radar (GPR) survey of the site. However, no archaeological features were revealed. The anomalies observed in the GPR survey corresponded with areas of modern disturbance.*

*Following the evaluation, an archaeological watching brief was carried out on all groundworks that had potential to impact upon archaeological deposits. The groundworks included general ground reduction and excavation of footings and service trenches. A number of modern features, including a bottle/metal waste dump, two redundant water pipe trenches and a manhole, three soakaways and two modern rubbish pits, were revealed. Another pit, possibly archaeological, was revealed within a pad-stone footing, although no finds were recovered from which to estimate a date.*

*The most archaeologically significant feature revealed was a north-east – south-west aligned burial. However, the skeleton was in very poor condition, with only the legs surviving. A single fragment of Bronze Age pottery was recovered from the grave fill, although this was probably residual. It likely that the burial dates to the Saxon period, given its proximity to the site of a furnished Saxon burial that was revealed during groundworks at No.2 Stephen Road in 2003.*



## 1 INTRODUCTION

### 1.1 Scope of work

- 1.1.1 Between November 2011 and May 2013, Oxford Archaeology carried out a series of archaeological investigations at 10 Stephen Road, Headington, Oxford. The works were carried out in advance of and during a redevelopment for housing, comprising four town houses (Buildings A – D on Figure 4) and four apartments (Building E), with associated parking plots and gardens.
- 1.1.2 The work was undertaken as a condition of Planning Permission (Planning ref: 08/01961/FUL), and was commissioned by Mr Martin Cotter. All archaeological work followed a Written Scheme of Investigation (OA 2011), which was produced in response to an archaeological brief set by David Radford, Oxford City Council Archaeologist (Radford 2011).
- 1.1.3 In November 2011, an archaeological watching brief was carried out during the grubbing-out of foundations pertaining to the buildings previously situated on the site. Following this (December 2011), a Ground Penetrating Radar (GPR) survey was carried out by Stratascan (Fig 2), in order to identify areas of potential archaeological interest, prior to intrusive works. The GPR survey highlighted a limited number of areas of potential archaeological interest. In order to investigate these, two archaeological evaluation trenches (3.5 m by 10 m) were excavated on the site (Figures 2 and 3).
- 1.1.4 The archaeological evaluation revealed no archaeological features or deposits. In response to this, an amendment was made to the original archaeological brief (Radford 2011), which had required a full archaeological excavation of the development area, stating that the groundworks for the redevelopment could continue under a controlled watching brief (Radford 2012).
- 1.1.5 An archaeological watching brief was carried out on all groundworks, including general ground reduction of the development site and the excavation of footings and service trenches.

### 1.2 Location, geology and topography

- 1.2.1 The site is located in Stephen Road, Headington (NGR: SP 5446 0718). Headington is a suburb in East Oxford. It lies at the top of Headington Hill overlooking the city. Prior to the redevelopment works, the site comprised tarmac, garages and a dwelling.
- 1.2.2 The underlying geology is Beckley Sand Member (sand and calcareous sandstone).

### 1.3 Archaeological and historical background

- 1.3.1 The village of Headington has its origins in the Saxon period, but the earliest archaeological evidence from the area comprises scattered finds of flint objects dating between the Mesolithic and Bronze Age, a Neolithic polished axe and flint scraper and Bronze Age and Iron Age pottery (JMHS 2007). Pottery sherds from the area attest to Romano British activity, but have no association with archaeological features (ibid.).
- 1.3.2 Headington derives from the Saxon personal name, *Hedena* (Bloxham and Shatford 1996, 9) and it has been suggested that the village was the nucleus of a Saxon Royal Manor (VCH 1957, 157). The most compelling evidence for this Royal connection comes from a charter of AD 1004 by Ethelred, which states: *in villa regia quae vocatur Hedindona* (in the royal residence, which is called Headington). This connection is also made on the first edition Ordnance Survey map of 1876, which records the foundations





of an ancient building known as Ethelred's Palace in Court Close, adjoining Manor Farm. However, archaeological evidence is yet to be found to corroborate this (OA 2003).

- 1.3.3 Early Anglo Saxon activity is notoriously difficult to detect in the archaeological record (Crawford 2010) and the Headington area is no exception. Loom weights or pot boilers, believed to be early post-Roman, were found in 1876 on the site of the reservoir at the top of the hill leading to Headington (OA 2007). In addition, two early Saxon burials have been recorded in the area. The first is an unaccompanied burial that was exposed close to the Fox Inn at Barton, a quarter of a mile east of Headington village during the construction of the Oxford northern bypass in 1931. It was found at the bottom of a sunken-featured building (*Grübenhaus*) from which Saxon sherds were also recovered (VCH 1957, 356). The second burial was discovered during an archaeological watching brief carried out at 2 Stephen's Road, Headington (OA 2003). The burial was that of a 40 to 50 year-old female, who was accompanied by a range of grave goods, including two copper alloy brooches, a copper alloy pin, a necklace of amber beads, an iron knife and another iron object that was unidentified (OA 2003). A mid-late 6<sup>th</sup> century date was assigned to the burial.
- 1.3.4 It is very unlikely that either of the burials were in isolation and they belong to a more extensive Saxon pagan cemetery. Anglo Saxon cemeteries may be concentrated or dispersed and may comprise inhumations and cremations, the latter of which can be in containers made of glass, ceramic or metal. Both types of burial can be accompanied by grave goods, most notably food offerings and jewellery.
- 1.3.5 A number of important Anglo-Saxon cemeteries have been found in Oxfordshire, (for example, at Abingdon and Berinsfield), and have made a significant contribution to present understanding of early Anglo-Saxon furnished inhumation ritual (Crawford 2010). Cremation burials and cemeteries comprising inhumations and cremations have, however, been less studied (*ibid.*).



## 2 WATCHING BRIEF AIMS, OBJECTIVES AND METHODOLOGY

### 2.1 Aims and objectives

#### 2.1.1 The aims and objectives of the works were:

- To determine the extent, condition, nature, character, quality and date of any archaeological remains affected by the proposed works.
- To signal before the destruction of any archaeological deposits and to allow for the preservation by record of any such remains in advance of the development or other potentially disruptive works.
- In the event that a cemetery was discovered, to establish its character and extent.
- To examine any skeletons and grave goods in order to gain information on the date of the cemetery, its length of use, health and status.
- To establish the ecofactual and environmental potential of archaeological deposits and features within the site and to take samples where appropriate.
- To provide a full illustrative, photographic and written record of any archaeological deposits encountered, including articulated burials.
- To make available the results of the investigation.

### 2.2 Methodology

- 2.2.1 The archaeological evaluation trenches were excavated using a 1.5 tonne mini digger. Each trench was 10 m in length by 3.5 m in width, and was excavated to a depth of 1.5 m below ground level.
- 2.2.2 The watching brief observed all groundworks that had the potential to affect or reveal archaeological deposits. This included general ground reduction and the excavation of footings and service trenches by machine. Any archaeological features and buried human remains were excavated, recorded and (where appropriate) removed.
- 2.2.3 All excavation and recording followed procedures detailed in the *OA Fieldwork Manual* (OA 1992). Mechanical excavation was undertaken under archaeological supervision. General ground reduction was undertaken using an 8 tonne excavator fitted with a 1.5 m trenching bucket. Footings and service trenches were excavated using a variety of bucket sizes. Soil was removed in level spits until the archaeologically relevant layer was reached, or the construction formation level was achieved, whichever was higher. All investigation of archaeological levels was carried out by hand, with cleaning, examination and recording in both plan and section. Burial archaeology was carried out in accordance with IFA and BABAO guidelines (Brickley and McKinley 2004; BABAO 2010a, b).
- 2.2.4 Archaeological features and deposits were issued with unique context numbers and written descriptions of these were recorded on pro forma sheets. Archaeological features were recorded in plan (1:20) and in section (1:10) (where appropriate). Where appropriate, black and white negative and colour digital photographs were taken.

## 3 RESULTS

### 3.1 Soils and ground conditions

3.1.1 The majority of the excavations took place within the subsoil and natural layers, and the stratigraphy was generally very clear throughout the works. Groundwater was not encountered in any of the excavations. During wet weather, there was considerable ground surface disturbance and trench collapse due to the soft, sandy nature of the subsoil and natural deposits.

### 3.2 Description of archaeological deposits

#### *Evaluation trenches 100 and 200 (Figures 2 and 3, Plates 1 and 2)*

3.2.1 Both evaluation trenches were 10 m in length and 3.5 m in width. Trench 100 was orientated east – west across the development site, and was located over an area identified as a 'complex anomaly – possibly associated with burial' on the GPR survey (see Fig 2 and Appendix A).

3.2.2 Trench 200 was orientated north-south, with the southern end against the southern edge of the redevelopment area. This trench was positioned over an area defined as a 'discrete anomaly – weak evidence of a burial' on the GPR survey (see Fig 2 and Appendix A).

3.2.3 In both trenches the upper most deposit encountered was the topsoil (Figure 3, contexts 100 and 200 respectively). This comprised a fairly loose, dark greyish brown, silty sand, approximately 0.25 m thick.

3.2.4 The subsoil (101/201), a loose, mid orange-brown sand, was revealed below the topsoil in both trenches. This was approximately 0.26 m thick.

3.2.5 Natural (102/202) was reached at approximately 0.5 m below ground level in both trenches. This comprised a light, brownish yellow, loose sand, and was excavated to a depth of up to 1.0 m.

3.2.6 No archaeological features were revealed within the evaluation trenches. In Trench 100, the complex anomaly highlighted in the GPR survey corresponded with an area of modern disturbance, which included a dump of modern mechanical waste, including battery cells and Bakelite casings.

3.2.7 Root disturbance was noted at the southern end of Trench 200. In addition, a modern oil spill containing ferrous oxide elements was observed within the topsoil and subsoil. It is likely that this corresponded with the discrete anomaly highlighted on the GPR survey.

#### *Watching brief on Block B ground reduction (Figure 4, Plate 3)*

3.2.8 Ground reduction in Block B was undertaken by machine under archaeological supervision. The total area reduced was approximately 23 m (north-south) by approximately 15 m (east-west). The ground level in this area sloped slightly, thus the depth to which the ground was reduced, varied from 0.4 m (below ground level) at the south-west corner of the site, to just 0.1 m in the north-east area of Block B.

3.2.9 As revealed within the evaluation trenches, the topsoil (1000), subsoil (1001) and natural (1002) were easily defined during ground reduction. Topsoil thickness varied from as little as 0.06 m to 0.25 m, whilst subsoil varied from 0.24 m to 0.35 m in thickness. Due to the variation in depth of ground reduction, natural was reached only



in the south-west and along the western edge of excavation. In the north-eastern area, the level of impact lay within the topsoil layer.

- 3.2.10 No features of archaeological importance were observed during ground reduction in Block B. However, a number of modern features were revealed (Figure 4).
- 3.2.11 In the very south-west corner of the site, a dump of glass bottles and metal waste material, including tin fragments and wire (1003) was revealed. This material was present within the topsoil and subsoil layers, but no cut/pit could be defined. This was probably due to heavy disturbance by tree roots. The glass bottles were clearly machine-moulded, indicating a 20<sup>th</sup> century (post World War 1) date (I. Scott 2013, pers. comm. 16<sup>th</sup> May).
- 3.2.12 In the western section of the excavation area, approximately 7.85 m north of the southern edge of site, a disused brick manhole (1004) was revealed (Plate 3). The structure comprised unfrogged bricks, approximately 0.23 by 0.11 by 0.07 m in size, bonded with lime mortar. Only three brick courses were visible within the excavated area. The shaft of the manhole had been backfilled with brick rubble in a greyish-brown, sandy silt matrix. The total external width (north-south) of the manhole was 0.93 m.
- 3.2.13 A disused, lead water pipe ran north-eastwards across the site, from the manhole (Plate 3). The east-west aligned pipe trench (1005), varying in width from 0.3 to 0.53 m, was visible across the entire width of the site. The trench backfill (1006) comprised a loose, mixed grey-brown, orange-brown and yellow silty sand, containing occasional stone and brick fragments, and animal bone.
- 3.2.14 A second lead pipe trench (1014), orientated east-west, was revealed further north, c. 10 m from pipe trench 1005. This varied greatly in width, from approximately 0.5 m at its western extent, to approximately 1.15 m further east. The backfill (1015) was a very mixed silty sand, and contained frequent bricks/brick fragments, both frogged and unfrogged, stone rubble, concrete, and ceramic pipe fragments.

***Watching brief on Block A and B building footings (Figures 4 – 6, Plates 4 and 5)***

- 3.2.15 The footings for Block A and B buildings (Buildings A – E on Figure 4) were excavated by machine (Plate 4). They ranged in width from 0.6 m to 0.75 m. These were excavated to depths of between 0.35 m and 1.45 m below ground level. Levels taken at the base of the footings ranged from 105.2 – 105.5 mOD.
- 3.2.16 Along the western side of the Block B building footings, four footings for pad-stones (Pad-stone footings A – D on Figure 4) were machine-excavated. Three of these were 1.5 m square, with base levels at 105.5 mOD (c. 0.75 m below ground level), whilst one measured 1.2 m by 1.875 m, with a base level of 105.2 mOD (c. 0.95 m below ground level).
- 3.2.17 Within the Block A footings, the upper-most deposit observed was a 0.2 m modern made-ground layer. Below this, the topsoil was 0.4 m thick. The subsoil was up to 0.6 m thick.
- 3.2.18 Within the Block B footings, the topsoil (1000) and subsoil (1001) depths were as observed during ground reduction (see 3.2.9), although only small areas of topsoil remained following the ground reduction. Natural (1002) was observed to a maximum thickness of 0.75 m in the pad-stone footings.
- 3.2.19 Within the pad-stone footing B two inter-cutting pits were partially revealed (Figure 5, Plate 5). Pit 1010, which was cut through the natural (1002) but appeared to be sealed by the subsoil (1001), was probably roughly circular, although only around a quarter of



it was revealed within the footing. The sides were concave and moderately sloping. The maximum dimensions revealed were 1.26 m east – west by 1.1 m north – south, with a depth of 0.75 m. The base was not reached. The fill of the pit (1011) comprised a homogenous, dark red-brown, silty sand with very occasional charcoal flecks. No finds were recovered.

- 3.2.20 Cut into the backfill of pit 1010 was modern rubbish pit 1012. This also appeared to be roughly circular although, as with pit 1010, only around a quarter of the pit was revealed within the footing. The maximum dimensions revealed were 0.84 m east – west by 0.54 m north – south, with a fully revealed depth of 0.65 m. The fill (1013) comprised a dark brown silty sand with modern waste inclusions (brick, tarmac etc.).
- 3.2.21 Two small, modern soakaways were revealed in the east – west footing for the northern wall of building D.
- 3.2.22 The most archaeologically significant feature observed was a south-east – north-west aligned human burial, revealed in the north – south aligned footing trench for the eastern wall of Building C (Figure 6, Plate 6). The burial ran beyond the limits of the footing trench so, in order to fully reveal it, the excavation area directly around the burial was expanded.
- 3.2.23 Only the lower half of the skeleton (1009) survived. It is possible that the upper half had been disturbed by animal activity, because evidence for burrowing in the eastern section of the footing trench was observed. That said, the leg bones that were present were so poorly preserved, undoubtedly a consequence of the acidic sandy soil, that it is possible that the bones of the upper body had eroded away completely.
- 3.2.24 The grave (1007) was cut through the natural (1002) and sealed by the subsoil (1001). The shape of the grave appeared to be sub-rectangular. This was difficult to define, however, because the backfill of the grave (1008) was very similar to the sandy natural through which it was dug. The backfill comprised an orange-brown silty sand with very occasional charcoal flecks. The maximum surviving dimensions of the grave were 0.9 m in width (south-west – north-east) by 1.3 m in length (north-west – south-east), with a depth of 0.28 m. The skeleton lay at c. 105.6 mOD (c. 0.75 m below ground level).
- 3.2.25 No grave goods were present with the burial, but a fragment of pottery was recovered from a sample of the backfill taken from directly around the skeleton (see 3.4.1).
- 3.2.26 No modern or archaeological features were observed during the excavation of Block A footings.

***Watching brief on the service trench and soakaway excavations (Figures 4 and 7, Plates 7 – 10)***

- 3.2.27 A series of service trenches within Blocks A and B were excavated under archaeological supervision. Sewage (0.25 m wide, up to 0.6 m deep) and water (0.25 m wide, 0.15 m deep) pipe trenches were hand-excavated across the footprints of each of the new buildings within Block B (Plate 7). Each of these was linked with a long, north-south service trench, which was excavated by machine, 0.45 m wide, 0.5 m – 1.15 m deep, along the back (eastern side) of these buildings (Plate 8). These service trenches revealed the subsoil (1001, up to 0.35 m) and natural (1002, up to 0.1 m). Topsoil remained in only a few areas, following ground reduction.
- 3.2.28 The north-south service trench adjacent to the back of Building D revealed a modern soakaway and a small, modern pit (1016), which was 0.6 m wide and 0.63 m deep. The fill of the pit (1017) was a dark grey-brown silty sand, with a significant organic



component and inclusions of stone and brick fragments, and occasional charcoal flecks. Fragments of animal bone, pottery/china fragments and a cast iron cobbler (Plate 9) were also recovered from the pit fill.

- 3.2.29 A further service trench (0.45m wide) was hand-excavated between Blocks A and B (Plate 10), with links into building E. This trench was excavated through ground that had previously been heavily reduced during the excavation of the building footings, thus the trench was just 0.2 m deep, and encountered natural sand (1002) only.
- 3.2.30 Another trench (0.5 m wide, 0.95 m deep) was excavated from the rear of Building A, through the garden plots of Buildings A, B and C, into a large soakaway excavated in garden plot C (Plate 11). Due to the soft, sandy soils, which were liable to collapse when excavated, the soakaway was excavated to 6 m by 6 m at the top and stepped down to the required dimensions of 4 m by 4 m at the base. Natural, undisturbed sand was reached at 0.3 m below ground level. Excavation of the soakaway was monitored to a depth of 1.3 m below ground level. No archaeological deposits or features were observed.

### 3.3 Palaeo-environmental remains

- 3.3.1 Only deposit 1008, fill of grave 1007, was suitable for environmental sampling. A 40 litre sample was taken of the soil directly surrounding the human remains.
- 3.3.2 Aside from a number of small bone fragments from Skeleton 1009, a single fragment of pottery was recovered from the soil sample.

### 3.4 Finds

#### *Pottery*

- 3.4.1 A single fragment of pottery was recovered from sample 1000 (grave fill 1008).
- 3.4.2 The fragment was just 25 by 20 mm in size, with a thickness of 9mm. The grog-temper, and the presence of two, very abraded, linear impressions on the outer surface, indicated an early Bronze Age, possibly Beaker, date (P. Booth and L. Brown, pers. comm. 16<sup>th</sup> May 2013).
- 3.4.3 The fact that the fragment was heavily abraded indicates that it may have been residual within the grave fill.
- 3.4.4 This pot fragment has been retained. Modern pot fragments were recovered from the topsoil (1000) and from modern pit fill 1017, but were not retained.

#### *Other finds*

- 3.4.5 Fragments of animal bone, clay tobacco pipe, brick, iron and glass were recovered from modern dump deposit 1003, pipe trench backfill 1006 and pit fill 1017, as well as the topsoil (1000). Given the modern date of these deposits, none of the finds were retained.

#### *Human remains*

- 3.4.6 A single articulated skeleton (1009) was recovered during the excavation of the footings along the eastern edge of the site.
- 3.4.7 The skeleton, which was only approximately 15% complete, was highly fragmented and in very poor condition. The bones of the upper body had not survived. Only bones of



the legs and feet were present. Age and sex could not be estimated due to the absence of diagnostic elements.

- 3.4.8 Given the position of the legs, it is assumed that the individual had been buried in an extended, supine position.
- 3.4.9 The individual's stature was estimated using the length of the left tibia. This was calculated to be approximately 171.9 cm if male, and 168.8 cm if female. The male stature is average for the Anglo Saxon period (172 cm), but the female stature is higher, than the average female stature for the period, which is 161 cm (Roberts and Cox 2003, 195).
- 3.4.10 No pathological conditions or non-metric traits were observed.
- 3.4.11 The skeleton was lifted and retained. It will be deposited with Oxford County Museum Service with the rest of the site archive.
- 3.4.12 See Appendix B for full osteological report.



## 4 DISCUSSION AND CONCLUSIONS

- 4.1.1 The archaeological works carried out at 10 Stephen Road, Headington, revealed a series of modern deposits/features, including a bottle/metal dump (1003), two disused lead water pipe trenches (1005 and 1014) and a brick manhole(1004), three soakaways and two modern rubbish pits (1012 and 1016).
- 4.1.2 Pit 1010, revealed within a pad-stone footing, may have been archaeological, but in the absence of finds, no date could be estimated.
- 4.1.3 The most significant feature revealed was Grave 1007 containing Skeleton 1009, found within the eastern footing trench for the Block B buildings. A single, small fragment of abraded pottery, probably Bronze Age in date, was recovered from the grave fill but may have been residual. The proximity of the grave to a furnished Saxon burial, found at 2 Stephen Road, indicates that it is instead of Saxon date.
- 4.1.4 The supine position of Skeleton 1009 was in keeping with that of the skeleton at 2 Stephen Road, although variant body positions are not uncommon in the Anglo-Saxon period (Booth *et al.* 2007, 238). The extended position is certainly not typical of a Bronze Age burial. The orientation of the burial (south-east – north-west) differed slightly from the north – south alignment observed at 2 Stephen Road but, again, burial orientations are variable within this period (*ibid.*, 238-243).
- 4.1.5 Skeleton 1009 was very incomplete, poorly preserved and lacking evidence for associated grave goods. Despite this, it adds to a growing body of evidence that may suggest that a Saxon cemetery existed within this area.





## APPENDIX A. CONTEXT INVENTORY

Context	Type	Thickness	Width	Length	Description	Finds	Date/ comments
Evaluation Trench 100							
100	Layer	0.24 m			Topsoil		Same as 200/1000
101	Layer	0.26 m			Subsoil		Same as 201/1001
102	Layer	1.00 m +			Natural		Same as 202/1002
Evaluation Trench 200							
200	Layer	0.25 m			Topsoil		Same as 100/1000
201	Layer	0.26 m			Subsoil		Same as 101/1001
202	Layer	1.00 m +			Natural		Same as 102/1002
Ground reduction, footings and service trench excavation							
1000	Layer	0.25 m			Topsoil		Same as 100/200
1001	Layer	0.35 m			Subsoil		Same as 101/201
1002	Layer	1.00 m +			Natural		Same as 102/202
1003	Deposit	c. 0.5 m		1.5 m +	Dump of modern materials	Glass bottles, Fe waste, wire, cans etc.	Modern
1004	Struct.	0.23 m +	0.93 m	0.35 m +			Modern
1005	Cut		0.53 m	c. 15 m	Pipe trench		Modern
1006	Fill		0.53 m	c. 15 m	Pipe trench backfill	Lead pipe, animal bone, brick	Modern
1007	Cut	0.28 m	0.9 m	1.3 m +	Grave cut		?Anglo-Saxon
1008	Fill	0.28 m	0.9 m	1.3 m +	Grave fill	Pottery	?Anglo-Saxon
1009	Skele				Adult skeleton		?Anglo-Saxon
1010	Cut	0.75 m +	1.4 m	1.4 m	Pit cut		?



Context	Type	Thickness	Width	Length	Description	Findings	Date/ comments
1011	Fill	0.75 m +	1.4 m	1.4 m	Pit fill		?
1012	Cut	0.7 m	1.0 m	1.0 m	Pit cut		Modern
1013	Fill	0.7 m	1.0 m	1.0 m	Pit fill	Tarmac frags	Modern
1014	Cut		1.15 m	c. 15 m	Pipe trench		
1015	Fill		1.15 m	c. 15 m	Pipe trench backfill	Brick, concrete, ceramic pipe	Modern
1016	Cut	0.63 m	0.6 m		Pit cut		
1017	Fill	0.63 m	0.6 m		Pit fill	Animal bone, Fe, pottery, china	Modern



## APPENDIX B. STRATASCAN GPR REPORT

**STRATASCAN**

# Geophysical Survey Report

**10 Stephen Road, Oxford**

For

**Oxford Archaeology**

January 2012

Job ref. J3020

Simon Haddrell BEng (Hons) AMBCS PIFA & Melanie Biggs BSc (Hons)



**Document Title:** Geophysical Survey Report - 10 Stephen Road, Oxford  
**Client:** Oxford Archaeology  
**Stratascan Job No:** J3020  
**Techniques:** Ground Penetrating Radar (400MHz)  
**Survey Date:** December 2011  
**National Grid Ref:** SP 544 071



*Plate 1: View south east across the southern section of site.*

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**Project Manager:** Simon Haddrell B.Eng (Hons) AMBCS PIFA  
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- Figure 2 1:200 Location of survey grids and referencing
- Figure 3 1:200 Abstraction and interpretation of radar anomalies

## **1 SUMMARY OF RESULTS**

The ground penetrating radar survey carried out at 10 Stephen Road has identified three possible burials. Two of these features, both located in the south of the site, only provide weak evidence for burials. The remaining anomalies are all likely to be associated with services or former buildings.

## **2 INTRODUCTION**

### **2.1 Background synopsis**

Stratascan were commissioned to undertake a geophysical survey of an area outlined for development. This survey forms part of an archaeological investigation being undertaken by Oxford Archaeology.

### **2.2 Site location**

The site is located at 10 Stephen Road, Oxford at OS NGR ref. SP 544 071.

### **2.3 Description of site**

At the time of surveying, the site had been cleared of pre-existing buildings and had been left as a rough soil surface with some areas of asphalt, small piles of earth and some manholes.

The underlying geology is sandstone of the Beckley Sand group (British Geological Survey website). There has been no drift geology recorded at this site (British Geological Survey website).

The overlying soils are not recorded due to the urbanisation of the area (Soil Survey of England and Wales, Sheet 6 South Eastern England).

### **2.4 Site history and archaeological potential**

The following information has been taken from the Written Scheme of Investigation provided by Oxford Archaeology.

Two early Saxon burials have been recorded in the area. The first is an unaccompanied burial that was exposed close to the Foxs Inn at Barton, a quarter of a mile east of Headington Village during the construction of the Oxford northern bypass in 1931. The second burial was discovered during an archaeological watching brief carried out at 2 Stephen Road, Headington. The burial was that of a 40 to 50 year-old female, who was accompanied by a range of grave goods, including two copper alloy brooches, a copper alloy pin, a necklace of amber beads, an iron knife and another iron object that was unidentified. A mid-late 6<sup>th</sup> century date was assigned to the burial.

It is very unlikely that either of the burials were in isolation and they may belong to a more extensive Saxon pagan cemetery. Anglo Saxon cemeteries may be concentrated or dispersed and may comprise inhumations and cremations, the latter of which can be in containers made of glass, ceramic or metal. Both types of burial can be accompanied by grave goods, most notably food offerings and jewellery.

A number of important Anglo Saxon cemeteries have been found in Oxfordshire, (for example Abingdon, Bernisfield) and have made a significant contribution to present understanding of early Anglo Saxon furnished inhumation ritual. Cremations and cemeteries comprising inhumations and cremations are, however, less studied.

Potential:

The development site lies in an area that has been noted for its high potential for archaeological remains of local/regional significance. In particular there is potential for Anglo Saxon burials in this location because of the Anglo Saxon female who was found at No 2 Stephen Road.

## 2.5 Survey objectives

The objective of the survey was to locate any anomalies that may be of archaeological significance prior to trenching.

## 2.6 Survey methods

A 400MHz GPR survey was used over the entire site. This technique was the most effective to locate burials and other archaeological features due to the urban nature of the site.

More information regarding these techniques is included in the Methodology section below.

# 3 **METHODOLOGY**

## 3.1 Date of fieldwork

The fieldwork was carried out on December 2<sup>nd</sup> 2011 when the weather was cool and sunny.

## 3.2 Grid locations

The location of the survey grids has been plotted in Figure 2 together with the referencing information. Grids were set out using a Leica 705auto Total Station and referenced to suitable topographic features around the perimeter of the site.



### 3.3 Description of techniques and equipment configurations

Two of the main advantages of radar are its ability to give information of depth as well as work through a variety of surfaces, even in cluttered environments which normally prevent other geophysical techniques being used.

A short pulse of energy is emitted into the ground and echoes are returned from the interfaces between different materials in the ground. The amplitude of these returns depends on the change in velocity of the radar wave as it crosses these interfaces. A measure of these velocities is given by the dielectric constant of that material. The travel times are recorded for each return on the radargram and an approximate conversion made to depth by calculating or assuming an average dielectric constant (see below).

Drier materials such as sand, gravel and rocks, i.e. materials which are less conductive (or more resistant), will permit the survey of deeper sections than wetter materials such as clays which are more conductive (or less resistant). Penetration can be increased by using longer wavelengths (lower frequencies) but at the expense of resolution (see 3.4.2 below).

As the antennae emit a "cone" shaped pulse of energy an offset target showing a perpendicular face to the radar wave will be "seen" before the antenna passes over it. A resultant characteristic *diffraction* pattern is thus built up in the shape of a hyperbola. A classic target generating such a diffraction is a pipeline when the antenna is travelling across the line of the pipe. However it should be pointed out that if the interface between the target and its surrounds does not result in a marked change in velocity then only a weak hyperbola will be seen, if at all.

The Ground Penetrating Impulse Radar used was a SIR3000 system manufactured by Geophysical Survey Systems Inc. (GSSI).

The radar surveys were carried out with a 400MHz antenna. This mid-range frequency offers a good combination of depth of penetration and resolution.

### 3.4 Sampling interval, depth of scan, resolution and data capture

#### 3.4.1 Sampling interval

Radar scans were carried out along traverses 0.5m apart on an orthogonal grid as shown in Figure 3. Data was collected at 80 scans/metre. A measuring wheel was used to put markers into the recorded radargram at 1m centres.

#### 3.4.2 Depth of scan and resolution

The average velocity of the radar pulse is calculated to be 0.10m/nsec which is typical for the type of sub-soils on the site. With a range setting of 50nsec this equates to a maximum theoretical depth of scan of 2.50m. Due to the geology and soils the maximum depth of penetration achieved on site was approximately 1.50m. A further

point worth making is that very shallow features are lost in the strong surface response experienced with this technique.

Under ideal circumstances the minimum size of a vertical feature seen by a 200MHz (relatively low frequency) antenna in a damp soil would be 0.1m (i.e. this antenna has a wavelength in damp soil of about 0.4m and the vertical resolution is one quarter of this wavelength). It is interesting to compare this with the 400MHz antenna, which has a wavelength in the same material of 0.2m giving a theoretical resolution of 0.05m. A 900MHz antenna would give 0.09m and 0.02m respectively.

### 3.4.3 *Data capture*

Data is displayed on a monitor as well as being recorded onto an internal hard disk. The data is later downloaded into a computer for processing.

## 3.5 Processing, presentation of results and interpretation

### 3.5.1 *Processing*

The radar plots included in this report have been produced from the recorded data using Radan software. Filters were applied to the data to remove background noise.

### 3.5.2 *Presentation of results and interpretation*

#### *Manual abstraction*

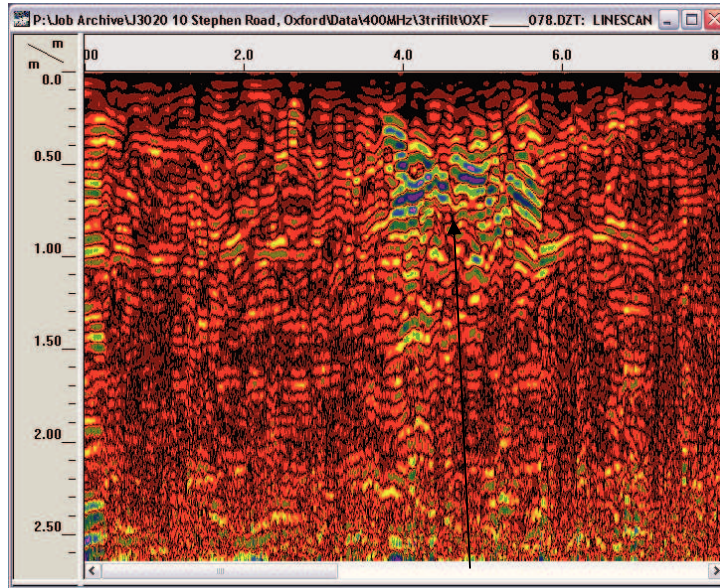
Each radargram has been studied and those anomalies thought to be significant were noted and classified as detailed below. Inevitably some simplification has been made to classify the diversity of responses found in radargrams. This abstraction is then employed as the primary source for producing the interpretation plot (Figure 3), but is not itself reproduced in the report.

- i. Strong and weak discrete reflector.  
These may be a mix of different types of reflectors but their limits can be clearly defined. Their inclusion as a separate category has been considered justified in order to emphasise anomalous returns which may be from archaeological targets and would not otherwise be highlighted in the analysis.
- ii. Complex reflectors.  
These would generally indicate a confused or complex structure to the subsurface. An occurrence of such returns, particularly where the natural soils or rocks are homogeneous, would suggest artificial disturbances. These are subdivided into both strong and weak giving an indication of the extent of change of velocity across the interface, which in turn may be associated with a marked change in material or moisture content.

- iii. Point diffractions.  
These may be formed by a discrete object such as a stone or a linear feature such as a small diameter pipeline being crossed by the radar traverse (see also the second sentence in iv. below).
- iv. Convex reflectors and broad crested diffractions.  
A convex reflector can be formed by a convex shaped buried interface such as a vault or very large diameter pipeline or culvert. A broad crested diffraction as opposed to a point diffraction can be formed by (for example) a large diameter pipe or a narrow wall generating a hybrid of a point diffraction and convex reflector where the central section is a reflection off the top of the target and the edges/sides forming diffractions.
- v. Planar returns.  
These may be formed by a floor or some other interface parallel with the surface. These are subdivided into both strong and weak giving an indication of the extent of change of velocity across the interface which in turn may be associated with a marked change in material or moisture content.
- vi. Inclined events.  
These may be a planar feature but not parallel with the survey surface. However, similar responses can be caused by extraneous reflections. For example, an “air-wave” caused by a strong reflection from an above ground object would produce a linear dipping anomaly and does not relate to any sub-surface feature. Normally this is not a problem as the antennae used are shielded, but under some circumstances these effects can become noticeable.
- vii. Conductive surface.  
The radiowave transmitted from the antenna has its waveform modulated by the ground surface. If this ground surface or layers close to the surface are particularly conductive a ‘ground coupled wavetrain’ is generated which can produce a complex wave pattern affecting part or all of the scan and so can obscure the weaker returns from targets lower down in the ground.
- viii. A category for “*focused ringing*” has been included as this type of anomaly can indicate the presence of an air void. This is created by the signal resonating within the void, but with a characteristic domed shape due to the “velocity pull-up effect”.

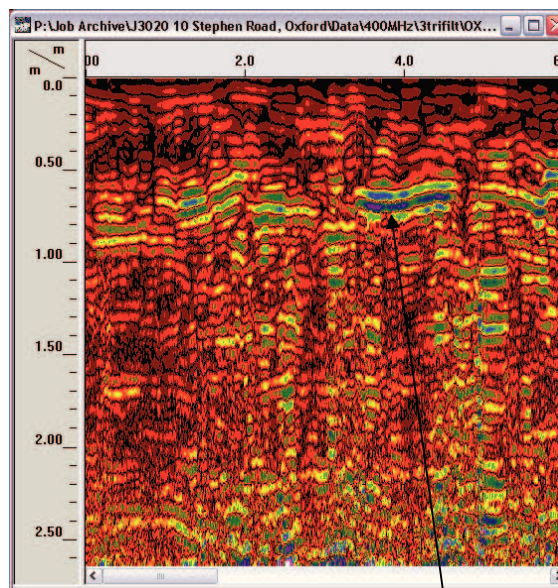
#### 4 RESULTS

A complex anomaly, possibly associated with a burial, has been identified within the centre of the survey area. This features measures approximately 2m by 1.4m and at a depth of 0.40m (see Example Radargram 1).

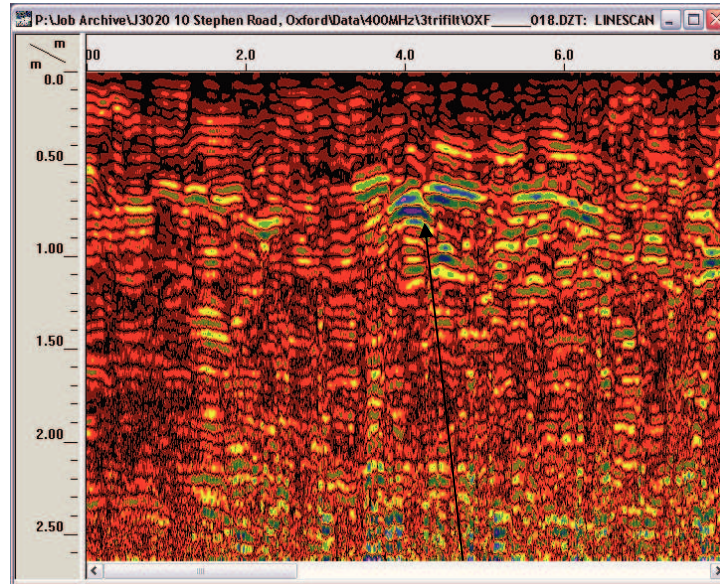


*Example Radargram 1 – Possible burial.*

Two anomalies, providing weak evidence for burials, are located within the south of the site. These features are both approximately 2m by 2m and at depths of around 0.6m.

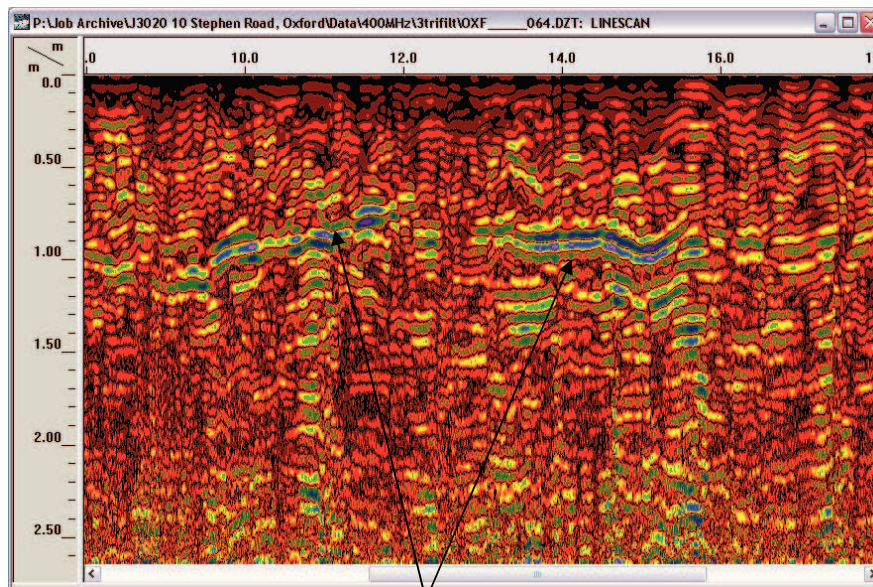


*Example Radargram 2 – Weak evidence for burial.*



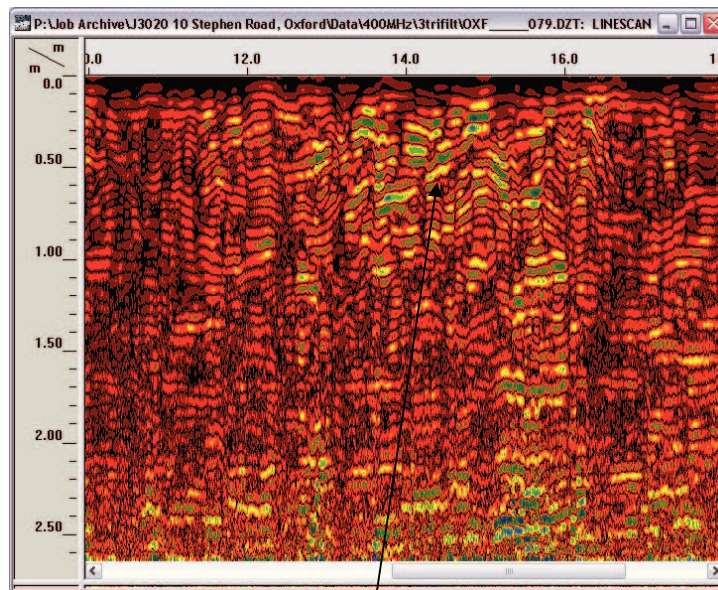
*Example Radargram 3 – Weak evidence for burial.*

A linear anomaly, associated with either a former building or service, is evident in the centre of the survey area (see Example Radargram 4). Further services have been identified within the northern half of the survey area.



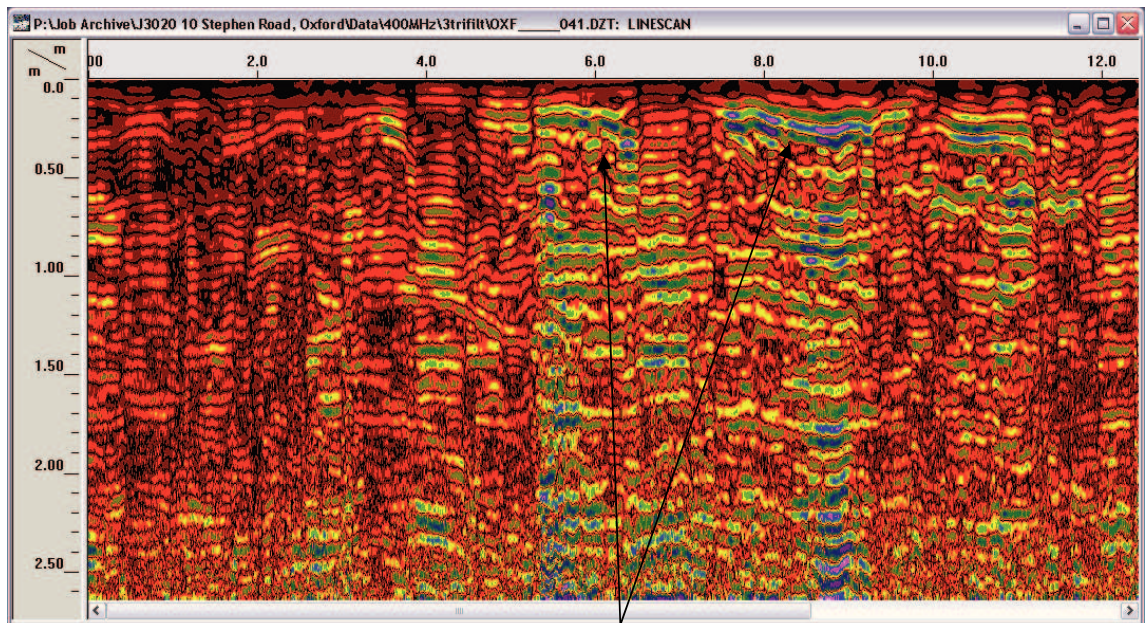
*Example Radargram 4 – Possible service.*

An area of weak complexity, which is likely to be caused by a former building, is evident in the north east of the survey area (see Example Radargram 5).



*Example Radargram 5 – Weak complex response associated with a former building.*

A series of planar responses, which are likely to represent a former surface level, is evident in of the survey area (see Example Radargram 6).



*Example Radargram 6 – Planar responses possibly relating to former surface.*

## **5 CONCLUSION**

The geophysical survey undertaken at 10 Stephen Road, Oxford, has identified three possible burials. The most likely of these features is within the centre of the site and consists of complex responses at a depth of 0.40m. Two further possible anomalies, both providing weak evidence of a burial, can be seen in the south of the site.

Non archaeological features identified within the site consist of services, an area of complexity associated with a former building and a possible former modern surface.

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 OS 100km square = SP



09  
08  
07  
06  
05



Survey Area

53 54 55 56 57

### Amendments

Issue No.	Date	Description
-	-	-
-	-	-

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Site centred on NGR SP 544 071

Client  
**OXFORD ARCHAEOLOGY**

Project Title Job No. 3020  
**10 STEPHEN ROAD, OXFORD**

Subject  
**LOCATION PLAN OF SURVEY AREA**

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 AND ENGINEERING

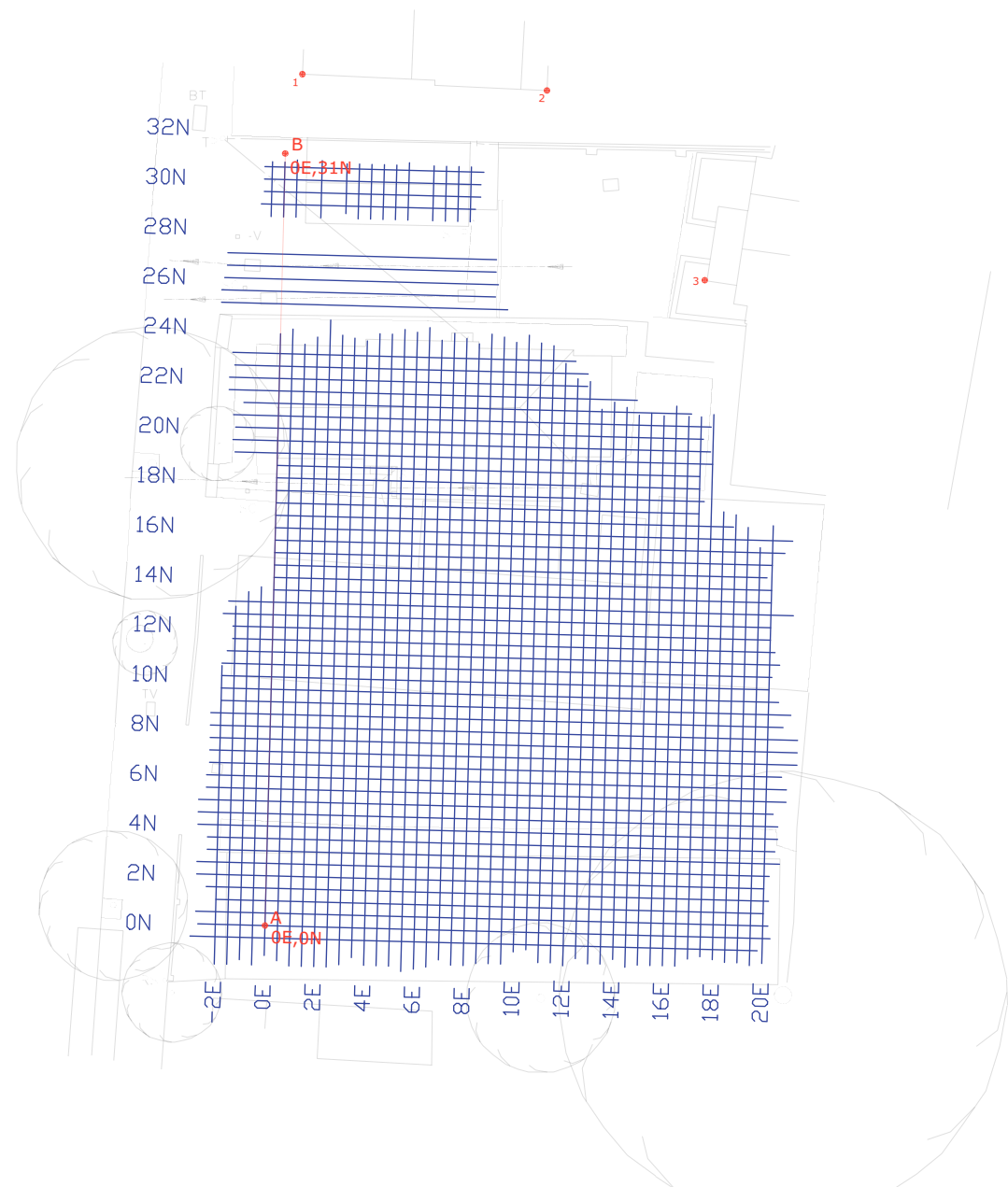
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Scale 1:25000  
 0m 500m 1000m

Plot <b>A3</b>	Checked by <b>PPB</b>	Issue No. <b>01</b>
Survey date <b>DEC 11</b>	Drawn by <b>MB</b>	Figure No. <b>01</b>





### Amendments

Issue No.	Date	Description
-	-	-
-	-	-

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### REFERENCING INFORMATION

A-B	31m Baseline				
A-1	34.3m	A-2	35.4m	A-3	31.4m
B-1	3.3m	B-2	10.8m	B-3	17.6m
1,2,3	Referencing points				

Client  
**OXFORD ARCHAEOLOGY**

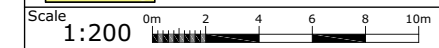
Project Title  
**10 STEPHEN ROAD, OXFORD**

Job No. 3020

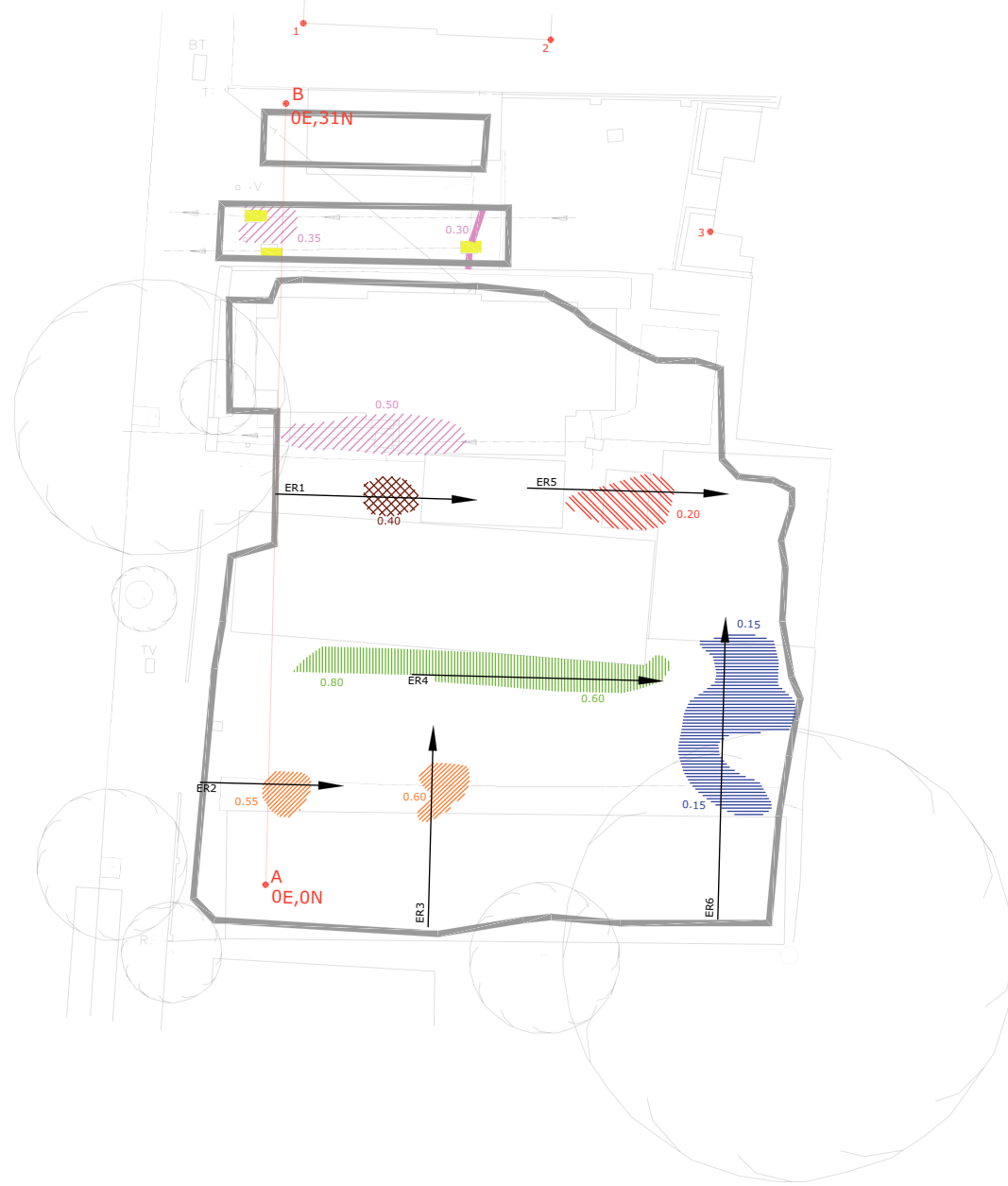
Subject  
**LOCATION OF SURVEY GRIDS AND REFERENCING**

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AND ENGINEERING

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Plot	A3	Checked by	PPB	Issue No.	01
Survey date	DEC 11	Drawn by	SDH	Figure No.	02



### Amendments

Issue No.	Date	Description
-	-	-
-	-	-

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### KEY

- Complex anomaly - possibly associated with burial
- Discrete anomaly only seen in one direction of radar - weak evidence of burials
- Area of complexity associated with former building
- Linear anomaly possibly associated with service or former building
- Near surface anomalies - possibly associated with former surface
- Inspection chamber
- Area of services
- Service

- 0.00 Depth to top of feature
- Example Radargram - see written report

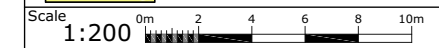
Client  
**OXFORD ARCHAEOLOGY**

Project Title Job No. 3020  
**10 STEPHEN ROAD, OXFORD**

Subject  
**ABSTRACTION AND INTERPRETATION OF RADAR ANOMALIES**

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Plot <b>A3</b>	Checked by <b>PPB</b>	Issue No. <b>01</b>
Survey date <b>DEC 11</b>	Drawn by <b>SDH</b>	Figure No. <b>03</b>



## APPENDIX C. THE HUMAN SKELETAL REMAINS

### ***B.1 Introduction***

A single articulated skeleton was recovered during the archaeological investigations at 10 Stephen Road, Headington. Following in situ recording, skeleton 1009 was lifted and transferred to OA for processing and analysis.

### ***B.1 Methodology***

Processing of the remains involved laying the bones out to dry at room temperature, following which, they were dry brushed to remove the sandy soil. Cleaning with water was not possible due to the extremely poor condition of the remains.

Osteological recording of skeleton 1009 was undertaken by a qualified osteoarchaeologist, with reference to standard protocols for examining human remains from archaeological sites (Brickley and McKinley 2004; Buikstra and Ubelaker, 1994; Cox and Mays, 2000). The completeness and level of fragmentation of the skeleton were noted, and condition was scored in accordance with McKinley (2004, 16). An inventory of the bones present was also made. Age and sex could not be estimated due to the absence of diagnostic elements. Bones were macroscopically examined for the presence of pathological lesions and non-metric traits. Estimation of stature was calculated using the complete length of a tibia, and applying it to the appropriate regression formula (Trotter and Gleser 1952; 1958; Trotter 1970).

### ***B.2 Results***

Skeleton 1009 was approximately 15% complete, comprising only partial leg bones (femora, tibiae and fibulae) and partial bones of the feet (tali, calcanei, left navicular, cuboid and fifth metatarsal). Fragmentation was extremely high, and surface condition was scored as Grade 5+, meaning that all bone surfaces were heavily eroded, resulting in modification of the profile of the bones (McKinley 2004, 16).

Although heavily eroded along the shaft of the bone, the entire length of the left tibia was present for measurement (with reconstruction at a single, clean break). Using the length of the tibia (370 mm), and assuming that this was a Caucasian individual, a stature of 171.9 cm (+/- 3.37 cm) for a male, or 168.8 cm (+/- 3.66 cm) for a female, was calculated. If skeleton 1009 is indeed Anglo Saxon, and was male, the stature is average for the period. The mean stature for males during this period was 172 cm (Roberts and Cox 2003, 195). The average stature for females during this period was 161 cm (ibid, 195), so if skeleton 1009 was female, they were above average height.

No non-metric traits or pathological lesions were observed.

### ***B.3 Potential for further study***

Due to the poor condition of the bones there is no potential for further macroscopic osteological analysis. However, it may be possible to take a sample of the bone for radiocarbon dating. Pre-screening the bone to determine whether it would be suitable for radiocarbon dating is advisable, given its condition (Brock et al 2010).



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## APPENDIX E. SUMMARY OF SITE DETAILS

<b>Site name:</b>	10 Stephen Road, Headington, Oxford
<b>Site code:</b>	OXHE10S11
<b>Grid reference:</b>	SP 5446 0718
<b>Type:</b>	Evaluation and watching brief
<b>Date and duration:</b>	November 2011 – May 2012 (intermittent)
<b>Area of site:</b>	c. 35m (north – south) by 25m (east - west)

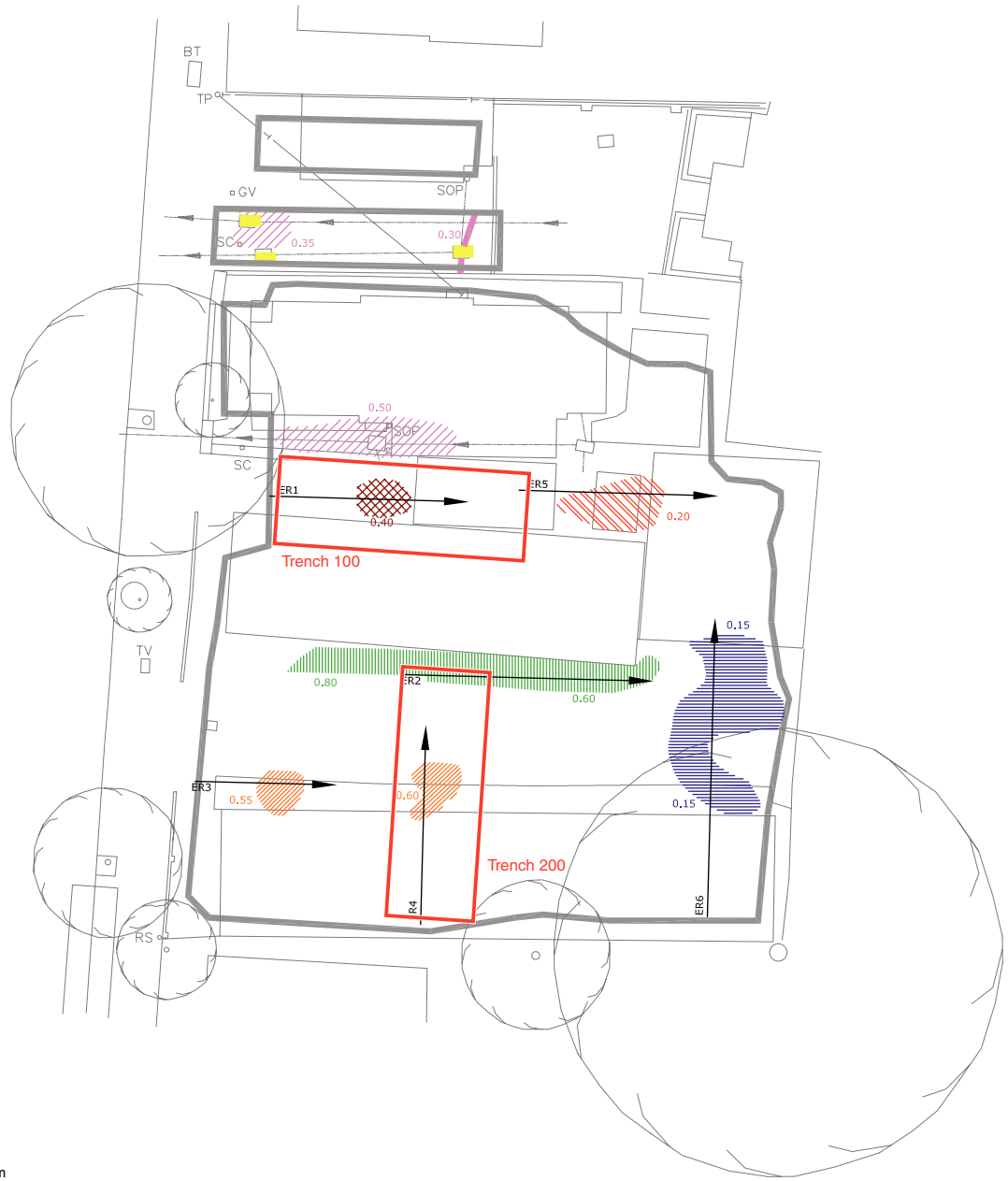
**Summary of results:** A single, poorly preserved and incomplete, articulated burial was also revealed. A fragment of residual Bronze Age pot was present in the backfill of the grave, but there was no direct dating evidence for the burial itself. It is possibly Anglo-Saxon, given its proximity to the furnished Anglo-Saxon burial previously revealed at the 2 Stephen Road. The watching brief also revealed a series of modern features including a bottle/metal waste dump, two redundant water pipe trenches and a manhole, three soakaways and two modern rubbish pits. Another pit, possibly archaeological, was revealed but no dating evidence was recovered.

**Location of archive:** The archive is currently held at OA, Janus House, Osney Mead, Oxford, OX2 0ES, and will be deposited with Oxfordshire County Museum Service in due course, under the following accession number: OXCMS:2011.183

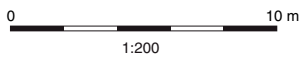


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Figure 1: Site location



Evaluation trench



Amendments		
Issue No.	Date	Description
-	-	-
-	-	-
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<b>KEY</b>		
	Complex anomaly - possibly associated with burial	
	Discrete anomaly only seen in one direction of radar - weak evidence of burials	
	Area of complexity associated with former building	
	Linear anomaly possibly associated with service or former building	
	Near surface anomalies - possibly associated with former surface	
	Inspection chamber	
	Area of services	
	Service	
0.00	Depth to top of feature	
	Example Radargram - see Figure B	
Client		
<b>OXFORD ARCHAEOLOGY</b>		
Project Title		Job No. 3020
<b>10 STEPHEN ROAD, OXFORD</b>		
Subject		
<b>INTERPRETATIONS</b>		
<b>STRATASCAN™</b>		
<b>GEOPHYSICS FOR ARCHAEOLOGY AND ENGINEERING</b>		
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	SUMO GROUP MEMBER	
Scale 1:200		
Plot	Checked by	Issue No.
A3	DGE	P1
Survey date	Drawn by	Figure No.
DEC 11	SDH	A

Figure 2: Stratascan plan showing results of GPR survey with location of evaluation trenches



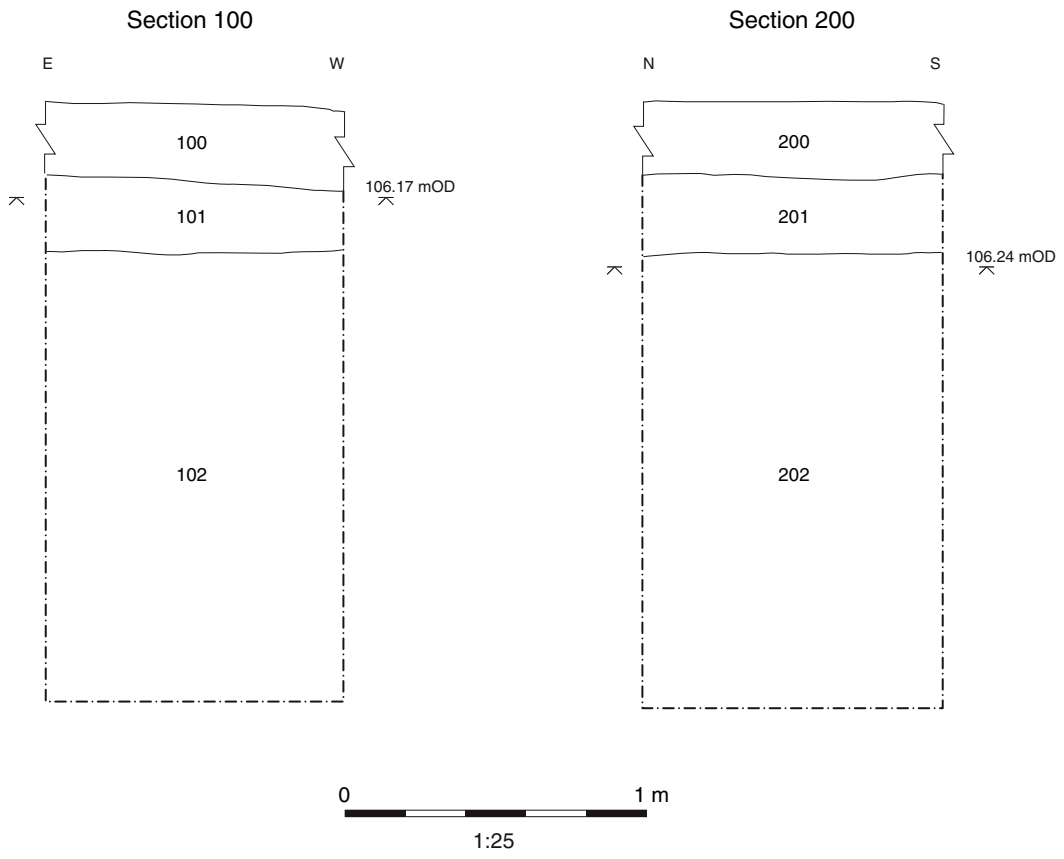
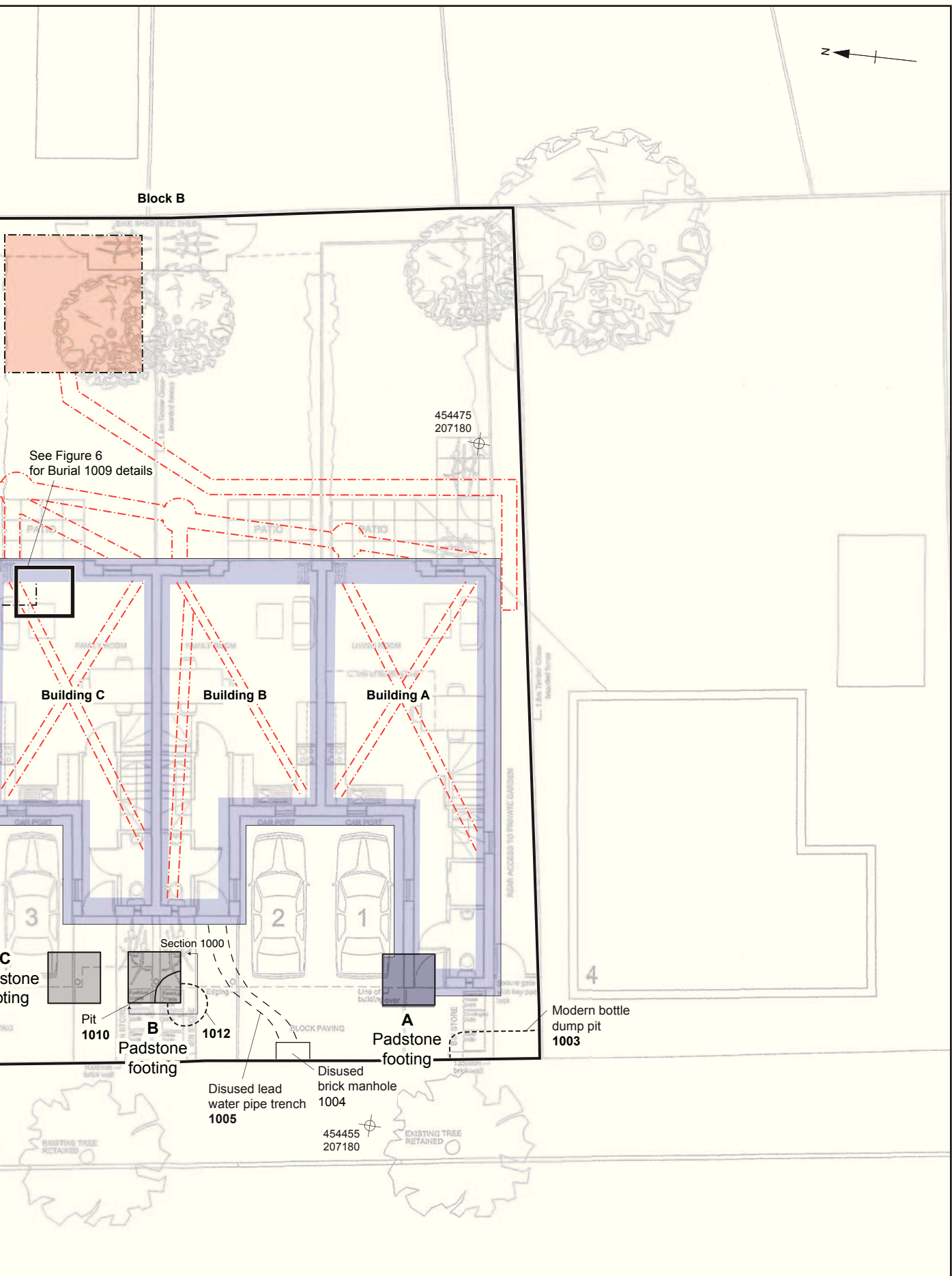


Figure 3: Trenches 100 and 200 sample sections



...ing Block A and B footings, service trenches and soakaway (base plan produced by Riach Architects, 2008)

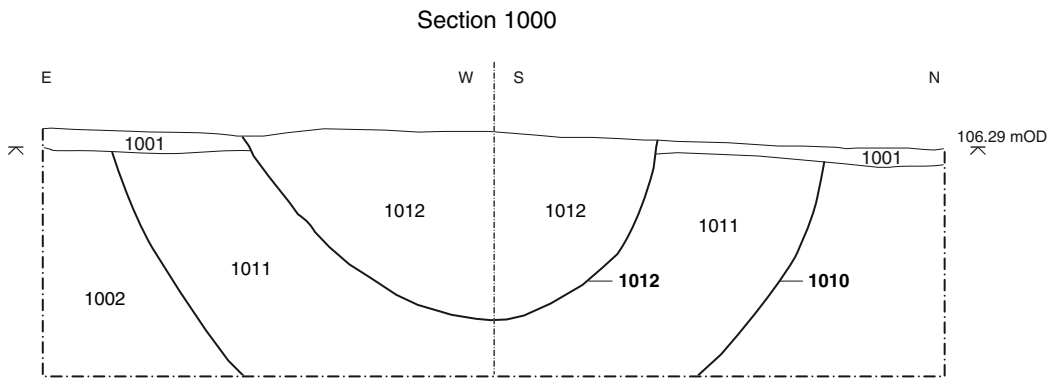


Figure 5: North and east facing sections of pad-stone footing B, showing pits 1010 and 1012

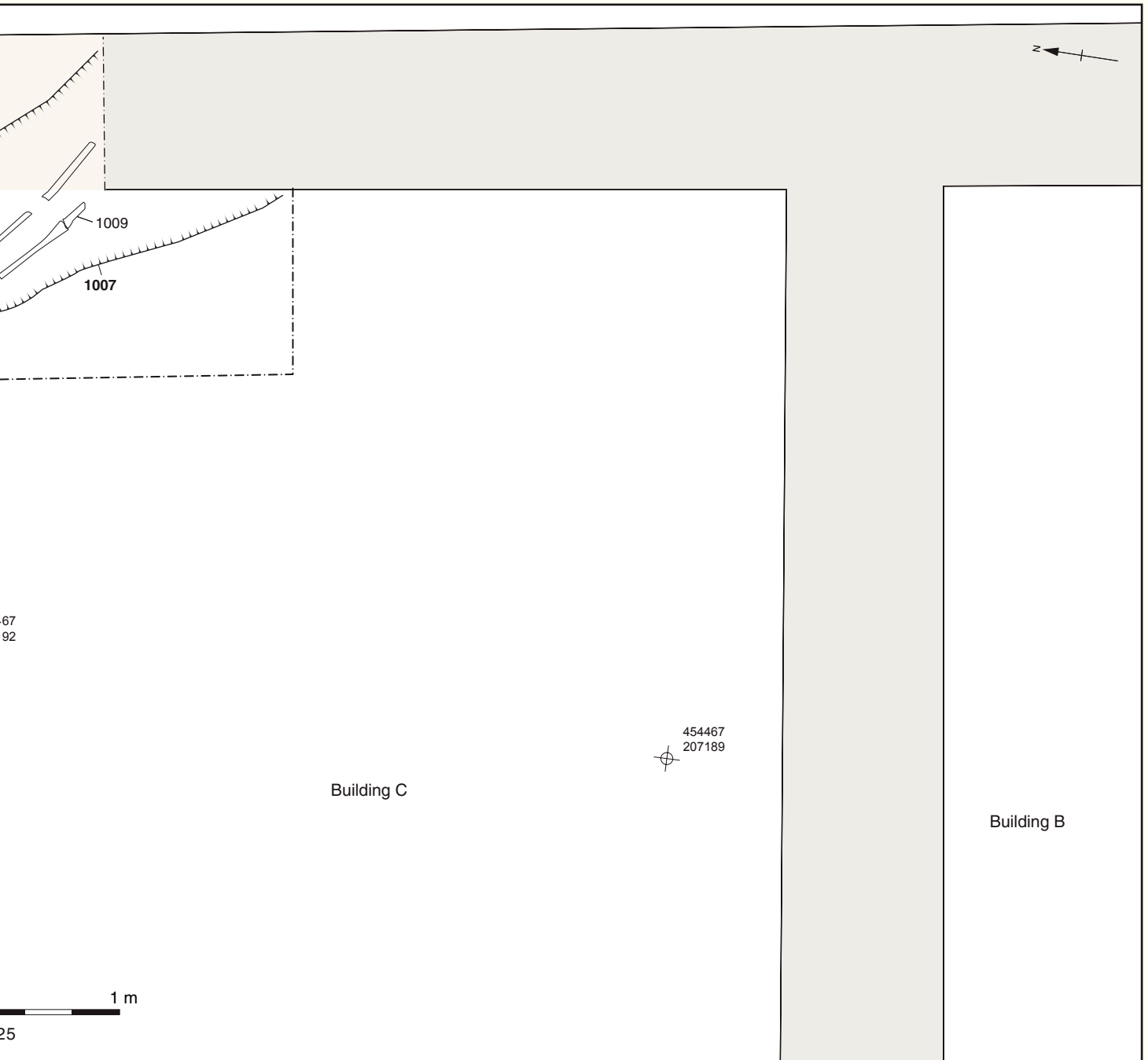


Figure 6: Grave 1007, Skeleton 1009

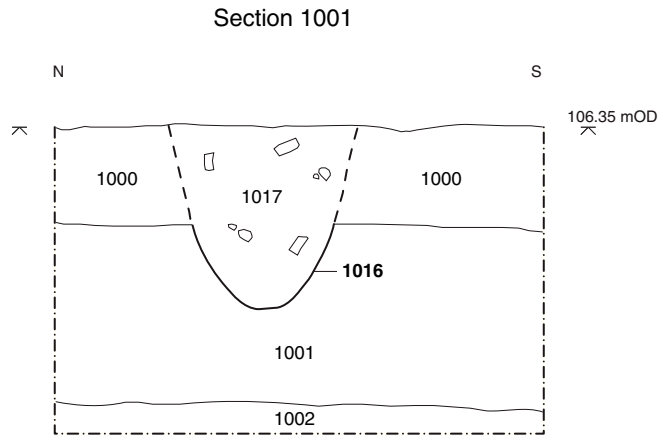


Figure 7: West facing section of eastern footing trench (Block B), pit 1016



Plate 1 Evaluation trench 100 (view east)



Plate 2 Evaluation trench 200, excavated to upper level of natural (view south) (view north-west)



Plate 3 Disused brick manhole 1004 and water pipe trench 1005



Plate 4 Working shot, excavation of Building A footing trenches (view east)



Plate 5 Pad-stone footing B, Pits 1010 and 1012 (view south-west)



Plate 6 Grave 1007, Skeleton 1009 (view west)



Plate 7 Sewage and water service trenches in Building A (view east)



Plate 8 North – south aligned service trench at back (east) of Buildings A – D (view south)



Plate 9 Iron cobbler from Pit 1016



Plate 10 East – west aligned service trench between Blocks A and B (view west)



Plate 11 Soakaway in garden plot of Building C (view north)







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