ARCHAEOLOGICAL EXCAVATION REPORT:

ISAAC NEWTON BUILDING, UNIVERSITY OF LINCOLN, LINCOLN

NGR: SK 97031 70979
Planning Reference: 2015/0126/RM
AAL Site Code: LUIN 15
Museum Accession Number: LCNCC: 2015.57
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Contents

Executive Summary 1

1.0 Introduction 2

2.0 Site Location and Description 2

3.0 Planning Background 2

4.0 Organisation of Report 3

5.0 Archaeological and Historical Background 3

6.0 Research Aims 3

7.0 Methodology 4

Excavation 4

Finds Methodology 5

8.0 Stratigraphic Description 5

9.0 Lithic Artefacts 6

Raw materials 6

Condition 7

Debris 8

Cores 8

Core-trimming Elements 10

Debitage 10

Microburin technique and related by-products 11

Tools 12

10.0 Pottery 16

11.0 Bead 17

12.0 Discussion and Conclusions 19

13.0 Effectiveness of Methodology 22

14.0 Acknowledgements 22

15.0 References 22

List of Plates

Plate 1: Cores (SF254, SF131 and SF258) 9

Plate 2: Refitted failed microburin (SF317) and trihedral point (SF316) 12

Plate 3: Narrow-blade microliths (SF221, SF227, SF276, SF292, and SF239) 13

Plate 4: Notched blade (SF22) 15

Plate 5: Oblique arrowhead (SF241) 16

Plate 6: Microscope photograph of the bead 17

Plate 7: Drawing of the bead at scale 1.5:1 18

List of Appendices

Appendix 1: Context Summary List 24
Appendix 2: OASIS Project Summary 25
Appendix 3: Figures 26

List of Tables

Table 1: Absolute and relative frequencies of chipped-stone artefacts according to class 6
Table 2: Description of raw materials 7
Table 3: Absolute and relative frequencies of debris according to weight 8
Table 4: Absolute and relative frequencies of cores 9
Table 5: Absolute and relative frequencies of tools 14

List of Figures

Figure 1: Site location outlined in red 26
Figure 2: Location of excavation 27
Figure 3: Distribution of lithic tool artefacts and heat map showing density of burnt artefacts 28
Figure 4: Distribution of Late Neolithic and Bronze Age artefacts and heat map showing density of burnt artefacts 29
Figure 5: Distribution of lithic cores and heat map showing density of debris 30

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Cover image: View of proposed development area during excavation, looking west

Executive Summary

- Allen Archaeology Limited was commissioned by the University of Lincoln to undertake an archaeological excavation on land at the site of the proposed Isaac Newton building on the Brayford Campus of the University of Lincoln.

- The site is located over the, formerly much larger, Brayford Pool and a poolside marsh that expanded over the area in prehistory, creating a marshy environment that was present until drainage and reclamation occurred in the 19th century.

- An archaeological evaluation by auger survey and test pitting undertaken by in July 2015 allowed the creation of a model of the underlying deposits and provided radiocarbon dating for the sequence. A number of worked flints recovered from the hand sieving of a palaeosol at the base of the archaeological sequence attested to human activity in the area in the prehistoric period.

- Archaeological excavation comprised the investigation of a 17m x 8m area of the palaeosol and underlying sand at the base of the sequence. All finds identified during the excavation were located to a 25cm^2 grid square and, where possible, were recorded in three dimensions. In total, 1814 lithic artefacts, one potsherd, and a bead were recovered.

- The lithic assemblage was subject to detailed analysis. The majority of the material was identified as dating from the end of the Mesolithic period and it is probable that the site was visited by hunter-gatherer populations on a sporadic basis, perhaps seasonally, with groups exploiting the wetland resources afforded by the Brayford Pool.

- A small number arrowheads, the potsherd and bead gave dates ranging from the late Neolithic to later Bronze Age. It is likely that these stray finds were lost or discarded during transient activities in the area as there is no other evidence for substantial settlement in the region during this timeframe.

- The excavation strategy was effective in characterising the nature of local Mesolithic activity on the site and has led to a greater understanding of the regional character of activity during this era.

1.0 Introduction

1.1 Allen Archaeology Limited (AAL) was commissioned by the University of Lincoln to undertake a programme of archaeological excavation prior to the construction of the new Isaac Newton building at the University of Lincoln Brayford campus in Lincoln, Lincolnshire. The works were commissioned following consultation with the Heritage Team at the City of Lincoln Council to discuss mitigation of the site given the potential for significant prehistoric remains identified during the previous evaluation phase (AAL 2015a).

1.2 The works were undertaken in line with the national guidelines set out by the Chartered Institute for Archaeologists *'Standard and guidance for archaeological excavation'* (CIfA 2014) and the Historic England document *'Management of Research Projects in the Historic Environment*' (Historic England 2015), as well as regional guidance in '*The Lincolnshire Archaeology Handbook*' (LCC 2016), and a specification for the scheme of works (AAL 2015b).

2.0 Site Location and Description

2.1 The development area is located to the south of the historic core of the city of Lincoln, immediately to the north of the B1003 (Ropewalk), east of an existing pond and south of the Lincoln School of Engineering, on the Brayford Campus of the University of Lincoln. The site comprised an excavation area measuring *c*.17m x 8m in the northern part of a former car park. The site centres on NGR SK 97031 70979 and the ground level lies at approximately 5.3m aOD (above Ordnance Datum) (Figure 1).

2.2 The bedrock geology comprises Scunthorpe Mudstone Formation and Charmouth Mudstone Formation (BGS 2016). A detailed palaeotopographic study of the site shows that the overlying superficial deposits comprise a sequence of glacial sands overlain by marsh deposits and peats, with deep deposits of modern overburden on top (Rackham 2011).

3.0 Planning Background

3.1 A planning application was submitted to Lincoln City Council in September 2012 for the '*Development of University Campus to include Academic Buildings (D1), Offices (B1), Student Residential Accommodation (C2), Retail (A1), Restaurants and Cafes (A3) and Hotel (C1) with associated parking and landscaping* (Reference 2012/0473/O). Planning permission was granted in June 2013, with conditions, including for a programme of archaeological investigation to take place in advance of development.

3.2 A follow-up planning application was submitted to Lincoln City Council in March 2015 with detailed specifications for the *'Erection of a four storey building to accommodate College of Science, 500 seat Lecture Theatre and catering services'* (Reference 2015/0126/RM), in accordance with the outline planning permission described above. Conditional approval was granted in June 2015.

3.3 The current scheme of works comprised a programme of archaeological excavation and recording that was informed by the results of evaluation test pitting of the site (AAL 2015a). This approach is consistent with guidelines set out in the National Planning Policy Framework (NPPF) (Department for Communities and Local Government 2012).

4.0 Organisation of Report

4.1 This report follows the principles outlined by Historic England (2015), and is organised as follows. Section 5 relates the historical and archaeological background of the site. Section 6 outlines the aims of the research as based on knowledge prior to the excavation. Section 7 outlines the methodologies adopted for the excavation and post-excavation analysis. Section 8 describes the stratigraphy of the site. Section 9, 10 and 11, provide results of analysis of the lithic assemblage, pottery and the bead, respectively. Section 12 discusses the significance of the results in relation to the wider region and draws together conclusions.

5.0 Archaeological and Historical Background

5.1 The archaeological background to the development area has already been provided within the Masterplan for the Brayford Campus of the University of Lincoln (CgMs 2011), and is summarised here.

5.2 The site sequence comprises glacial sand, sealed by marsh silts of Mesolithic and Neolithic date. By the middle Bronze Age peat began to form across the area. This continued throughout the Bronze Age before changing to the accumulation of organic sediments as water levels rose.

5.3 The site lies within the area of Holmes Common, which remained virtually uninhabited until the end of the 19th century. When the common was transferred to the parish of St. Mary-le-Wigford by the provisions of the Divided Parishes and Poor Law Amendment Act of 1882, only 10 people in two houses were affected. The uppermost deposits in the area include upcast deposits associated with the construction of the Great Northern Railway in 1849 immediately to the north of the site; material associated with the later construction of Great Central Railway sidings, and the modern infilling of a large pond.

5.4 A series of test pits were hand excavated at depth immediately to the west of the site, prior to the creation of the existing Delph Pond (Field and Rylatt 2008). This work recovered 785 pieces of struck or modified flint of almost exclusively later Mesolithic date, including 154 pieces of burnt flint and chert.

5.5 An evaluation by auger survey and the excavation of test pits, undertaken in July 2015, established a model of the underlying deposits and identified a small assemblage lithic artefacts from the palaeosol horizon underlying the peat formation, dated to the later Mesolithic (AAL 2015a).

6.0 Research Aims

6.1 All research was undertaken within the priorities established in the Lincoln Archaeological Research Assessment (LARA) and with those emerging following more recent archaeological investigations to the west of the site in advance of the construction of the Delph Pond (Jones *et al*. 2003; Field and Rylatt 2008). The following research questions were devised as part of the method statement for the site:

- How is the site related to the investigations to the west of the Isaac Newton development?
- How does the area as a whole relate to the prehistoric utilisation of the Brayford Pool and the surrounding Witham Valley floodplain?

6.2 In addition, the works have potential for helping to better understand some of the national research aims as set out in the Research Agenda and Strategy for the Historic Environment of the East Midlands (Knight *et al*. 2012), including the following objectives:

- 2A – Enhance understanding of the environmental background to Mesolithic activity
- 2B – Characterise the regional and local evidence for Mesolithic activity
- 2G – Investigate the topographic locations of activity loci

7.0 Methodology

Excavation

7.1 In order to adequately deal with the potential constraints associated with the nature and extent of sediments surviving across the site, and the related sampling strategy, a programme of archaeological investigation was negotiated and agreed upon by the City of Lincoln Archaeologist and AAL (2015b).

7.2 The main phase of archaeological excavation ran from 9th–19th November 2016. The excavation was carried out by Project Supervisor Alan Telford with the assistance of up to ten experienced archaeologists.

7.3 A mechanical excavator was used to remove non-archaeological overburden, continuing to a depth of approximately 3.2m below existing ground level, *c.*0.2m above the targeted palaeosol. To achieve a safe working area a 23m x 14m area aligned northwest-southeast was excavated to a depth of 1.2m then stepped in 1.5m to create a 20m x 11m area. This was also machine excavated to a depth of 1.2m and the stepped in a further 1.5m to create a 17m x 8m area. The machine stripping was then continues a further 0.5m – 0.8m, before hand excavation commenced. The trench was divided into 1m^2 grid squares aligned perpendicular to the edges of the trench using a Leica GS08 RTK NetRover GPS. Each grid square was identified using an alphanumeric system consisting of a letter specifying the position of the grid square along the northwest-to-southeast axis and a number specifying the position along the southwest-to-northeast axis. The grid sequence ran from A–Q along the northwest-to-southeast axis and 1–9 along the southwest-to-northeast axis (e.g. the southeast corner grid square was labelled 'A1'). Each of the grid squares was further sub-divided in 0.25m^2 quadrants: southeast, southwest, northeast and northwest (e.g. A1SE). Excavation of each quadrant was then undertaken carefully by hand using a trowel. All excavated spoil was wet-sieved through a 4mm mesh for artefact recovery.

7.4 All artefacts were collected, other than obviously modern material from the overburden. Where possible all artefacts collected during the hand excavation were 3D located and bagged individually with the addition of a small find number. Artefacts recovered from wet-sieving were bagged and labelled with the appropriate context and grid number.

7.5 A full written record of the archaeological deposits was made on standard AAL context recording sheets. Each deposit or layer was allocated a unique three-digit identifier (context number) and accorded a written description — a summary of these are included in Appendix 1.

Finds Methodology

7.6 Each of the lithic artefacts was examined macroscopically using a 10x triplet hand lens. A catalogue of the technological attributes, indicative of the reduction methods and function of the artefacts, was compiled in Microsoft Excel. The catalogue also recorded the condition of the artefact, including the presence of patination, burning, and post-depositional damage. In addition to the attribute data, linear measurements were recorded using digital calipers with a precision of ±0.02 mm and the mass was recorded with a precision of ±0.1 g. A full descriptive catalogue of the lithic artefacts can be found in the project archive.

8.0 Stratigraphic Description

8.1 The most recent deposit recorded during the fieldwork was the car park surface 001, which comprised loose medium-sized gravel over coarse limestone hardcore, with an average thickness of 0.17m. This surface overlay a number of dumped deposits of modern levelling material, with an overall thickness of *c*.2m at the west end of the excavation area, and *c*.2.5m at the east end.

8.2 The modern made ground overlay a buried soil horizon, 005, *c*.0.20m thick, from which finds dated to the 19th century were recovered, though not retained. This horizon represents the ground surface prior to the levelling of the site, and was recorded at a level of *c.*3.38m aOD at the west end of the excavation area, and around *c.*2.73m aOD at the east end, suggesting that in the 19th century the land surface sloped from west to east on a gradient of approximately 1:26.

8.3 The soil horizon overlay the upper surface of the peat formation, 006. The peat was up to 0.75m thick, and was thicker towards the west end of the excavation area, where there was less truncation by modern levelling activity. Across the site, the average thickness of the peat was *c*.0.50m. The peat formation overlay deposit 007.

8.4 Deposit 007, was a soft, mid grey sand. This buried soil horizon pre-dates the beginning of the peat formation in the early 1st millennium BCE (Rackham 2011). The average thickness of the deposit was 77mm, although it was thicker across the centre of the site and within the northwest corner. The upper surface of the palaeosol was recorded at a maximum level of 2.54m aOD toward the northwest corner of the site, and sloped downwards from southwest to northeast to a low point of 2.23m aOD in the northeast corner. The gradient of the slope, at around 1:70, was more gradual than that of the modern ground surface that pre-dated the levelling of the site in the 20th century. In the western part of the site, where the palaeosol was generally recorded at a higher level, there was a shallow depression in the surface of the palaeosol (centred on square C4), where the upper surface of the deposit was *c*.70–80mm lower than the surrounding area.

8.5 Beneath the palaeosol, which was present across the entire base of the excavation area, the upper surface of the underlying fluvio-glacial sands, 008, was recorded at levels varying between 2.45m aOD and 2.11m aOD. As with the palaeosol, there was a gentle downward slope from the west end of the excavation area, where the upper surface of the sand was recorded at an average of *c*.2.40m aOD, and the east end of the area, at *c*.2.26m aOD.

9.0 Lithic Artefacts

By Joshua T Hogue

9.1 A total of 1,814 chipped-stone artefacts were recovered from the site (Table 1). In addition, 30 fragments of rounded quartzite and quartzite sandstone cobbles recovered, which appear primarily to have cracked due to burning. The overwhelming majority of the assemblage is indicative of stone-tool technologies utilised towards the end of the Mesolithic and transition to the early Neolithic. However, an oblique arrowhead, two chisel arrowheads, and a fragment of a barbed-and-tanged arrowhead, of later Neolithic or early Bronze Age date were also recovered.

Class	n	%
Blades	215	22.5
Flakes	605	63.2
Core-trimming elements	18	1.9
Burin spalls	5	0.5
Splintered pieces	2	0.2
Microburins	9	0.9
Krukowski microburins	1	0.1
Cores	25	2.6
Tools	78	8
Subtotal	***958***	
Chips	627	34.5
Chunks	230	12.7
Total	**1814**	

Table 1: Absolute and relative frequencies of chipped-stone artefacts according to class

Raw materials

9.2 A description of each of raw material identified from the excavations is given in Table 2. The vast majority of the chipped-stone assemblage consists of relatively good quality brownish yellow/dark yellowish brown flint (50.1%), whilst very dark grey/brown (19.4%) flint is also relatively common. These materials have thin, well-rounded, battered cortex, indicative of pebbles and cobbles obtained from river terrace gravels. A variety of different coloured and quality flints/cherts consistent with having derived from gravels are recorded in smaller proportions (0.3–3.4%). There are substantial sand and gravel river terrace deposits *c.*0.4km to the south, associated with the River Witham, and *c.*1.1 km west, associated with the River Till. Thus, raw materials could have been collected from outcropping gravel deposits in relatively close proximity to the Brayford Pool.

Coding No.	Description
1	Brownish yellow (10YR6/6) to dark yellowish brown (10YR4/4) translucent/semi-transparent flint with grey (10YR6/1) cortex
2	Very dark grey (10YR3/1) to brown (10YR5/3) translucent/semi-translucent flint with light greyish brown (10YR/6/2) cortex
3	Undifferentiated flint/chert
4	Light grey (2.5Y7/1) to very dark grey (Gley 1 8/N) opaque flint, often with grey (2.5Y5/1) light grey (2.5Y/7/1) inclusions/mottling, and thin white (2.5Y8/1) to light grey (2.5Y7/2) chalky cortex.
5	Dark yellowish brown (10YR4/4) to olive brown (2.5Y4/3) opaque to semi-translucent flint/chert.
6	Black (10YR2.5/1) to very dark greyish brown (10YR3/2) mottled flint/chert, with rounded/sub-rounded cortex light brownish grey (10YR6/2).

7	Light grey (5Y7/2) to pale yellow (5YR8/4) opaque chert with thin angular strong brown (7.5YR5/6) recorticated surface.
8	Light grey (7.5YR7/1) to brown (7.5YR5/3) quartzite sandstone, with very thin rounded cortex same colour as interior.
9	Grey (2.5Y6/1) opaque fossiliferous limestone, fossils appearing as very fine granular and platy structures 3% of structure.
10	White (2.5Y8/1) to grey (N6/0) quartzite, with occasional gypsum bands and crystals up to 2 mm, and very thin well-rounded cortex same colour as interior.
11	Dark grey (5Y4/1) fine-grained sedimentary mudstone.

Table 2: Description of raw materials

9.3 A small proportion of the assemblage is also made on distinctive light grey to very dark grey opaque flint (6.1%) that probably derives from the chalk formation of the Lincolnshire Wolds, located at least 25km northeast of the Brayford Pool. The diminutive quantities of artefacts made on nodules obtained from the Lincolnshire Wolds, and the high proportions of locally available raw materials, suggests a reduction in the size of hunter-gatherer territories, consistent with what we know of the later Mesolithic. In the early Mesolithic, Lincolnshire and Yorkshire Wolds flint dominates assemblages in northern England and hunter-gatherer populations ranged across larger distances in order to procure raw materials (Spikins 1999).

9.4 A moderate quantity of pieces were made on undifferentiated flint/chert (19.8%). A handful of raw materials were found in lesser amounts, including a couple of pieces on dark grey sedimentary mudstone (0.1%), quartzite sandstone (0.1%), quartzite (0.1%), and one piece of grey fossiliferous limestone (0.1%).

Condition

9.5 Most of the assemblage shows no evidence of patination (91.5%). There is a much smaller number of artefacts with patinated surfaces. Most are characterised by highly localised discolouration and/or speckling (5.7%), although a few have more heavily patinated surfaces (2.1%). A limited number of objects had differential patination on the surfaces (0.6%).

9.6 The assemblage contains a moderate quantity of artefacts with evidence of burning (22.8%). The burning varies in nature, including discolouration, cracking, incipient fractures, and the occasional detachment of pot-lids. In the extreme cases, the thermal damage had led to fracturing, crenulated breaks, and the shattering of artefacts. There is no clear evidence for the purposeful heat-treatment of raw materials. Instead, the heavily burnt nature of many of the pieces suggest that thermal alteration occurred after discard. It is plausible that knapping was undertaken adjacent to hearths and/or there was some form of cleaning of occupation areas between discrete episodes of activity with the refuse being discarded in hearths.

9.7 The spatial distribution of artefacts with evidence of burning indicates the possible locations for one or more hearths, perhaps even the remnants of a burnt mound (Figure 3). A large proportion of the burnt material is concentrated towards the centre of the trench. In particular, there is a distinct focus in and immediately around grid squares G3 and H3. There are smaller groups of material in surrounding grid squares F2, F5, I2, and I4. This may be related to the large concentration of material or, alternatively, may represent additional heaths. A further cluster of burnt material occurs to the northeast of the excavated area in M6. The distribution of debris associated with core reduction and tool manufacture shows a close correlation with the distribution of the burnt artefacts, although this should be expected as there is some overlap between the two categories, with particularly high concentrations in grid squares F2 and G3 (Figure 5). The distribution of recovered cores (Figure 5) also broadly corresponded with those

of the burnt artefacts and tools (Figure 3), although with a small cluster around grid square P7 in the north-eastern corner of the site where recovered tools were relatively sparse.

9.8 The majority of the assemblage is in a good state of preservation (95.2%), with fresh margins and no evidence of rolling, and remains unchanged since the moment of deposition, suggesting that the assemblage was recovered *in situ*. Only a small proportion of the assemblage exhibits evidence of post-depositional damage (4.8%), including discontinuous microchipping and differential patination of surfaces, suggesting that the objects were damaged during the excavation process.

Debris

9.9 In total, 47.2% of the assemblage is made up of non-diagnostic debris (i.e. chips and chunks). This irregular waste represents the unintended by-products of core reduction, as well as tool manufacture. The extremely high numbers of diminutive chips suggests that the site has remained largely intact, with no clear evidence to suggest the displacement of artefacts as a result of post-depositional processes (Table 3).

Weight (g)	**n**	**%**
<0.1	594	69.3
0.1–1.0	205	23.9
1.1–2.0	17	2.0
2.1–3.0	9	1.1
3.1–4.0	8	0.9
4.1–5.0	5	0.6
5.1–10.0	5	0.6
10.1–15.0	8	0.9
15.1–20.0	2	0.2
20.0–100.0	4	0.5
Total	**857**	

Table 3: Absolute and relative frequencies of debris according to weight

Cores

9.10 There are only a small number of cores (n=25)(Plate 1), although a diverse range of types are present (Table 4). The sample includes moderate proportions of flake cores (32.0%), single platform blade cores (12.0%), and opposed platform blade cores (8.0%). A number of core fragments were also recovered (28.0%), which primarily have blade removals. There are also several examples that have been prepared and/or initially struck (20.0%).

Type	**n**	**%**
Single platform blade cores	3	12.0
On narrow edge	(1)	
One single face	(1)	
Sub-pyramidal	(1)	
Opposed platform blade cores	2	8.0
On adjacent faces	(1)	
On same face	(1)	
Flake cores	8	32.0
Single platform	(1)	

Opposed platform	(1)	
Multi-platform	(4)	
Discoidal	(2)	
Core fragments	7	28.0
Flake	(1)	
Blade	(4)	
Indeterminate	(2)	
Prepared/tested	5	20.0

Table 4: Absolute and relative frequencies of cores

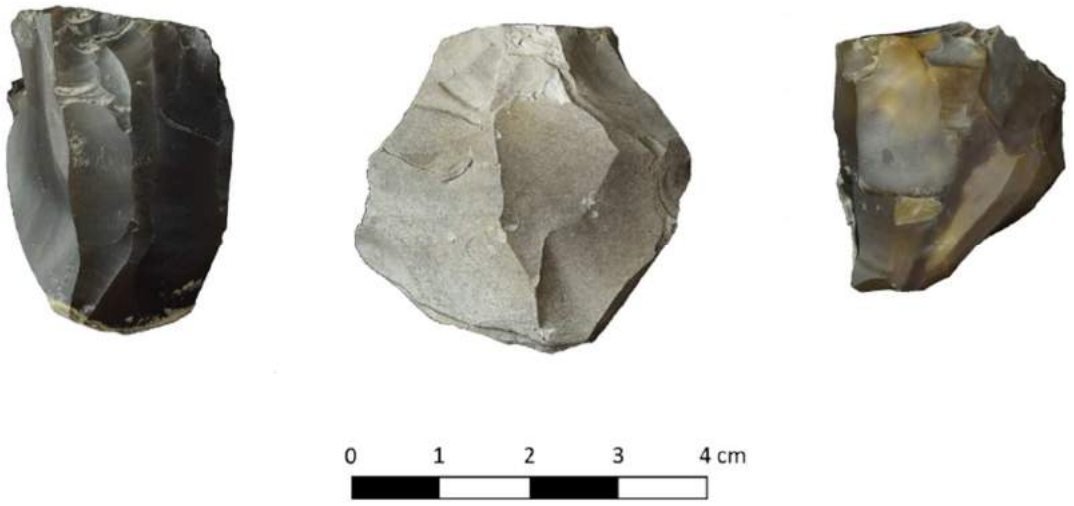

Plate 1: Cores (SF254, SF131 and SF258)

9.11 The cores are primarily manufactured on brownish yellow/dark yellowish brown flint (52.0%), with smaller proportions of very dark grey/brown flint (24.0%), olive brown/dark yellowish brown flint (12.0%), and light grey/very dark grey flint (4.0%). A number of cores were also heavily burnt and could not be reliably categorised according to raw material (8.0%), although all appear to have been manufactured on fine-grained siliceous materials. Most often cortex is retained on the exteriors (76.0%), which probably reflects the relatively small size of materials selected for knapping. In general, small nodules appear to have been selected, although occasionally flakes were utilised.

9.12 A relatively high proportion of the cores have evidence of platform abrasion, indicating that the removals were carefully controlled. There is some evidence for the concurrent working of striking platforms, although primarily blade removals seem to have been struck from a single platform until it was exhausted, and only then was the piece rotated an opposing platform established. All of the cores are restricted in size, with a mean length of 31.0 mm (range 20.3–40.2mm, std. deviation 6.5 mm, n=13), width of 24.9 mm (range 16.9–34.9mm, std. deviation 5.8mm, n=13), and thickness of 17.8 mm (range 10.2–27.9 mm, std. deviation 4.4mm, n=13). It appears that many were discarded because they became too small to produce desirably-sized blanks.

Core-trimming Elements

9.13 Eighteen core-trimming elements were recovered during the excavations. These account for 1.9% of the assemblage. There are nine crested pieces, five platform rejuvenation flakes, and four *flanc de nucleus*. The presence of these diagnostic pieces indicates that the core was carefully prepared with cresting in order to assist in the first blade removal and facilitate the successful removal of subsequent blanks, flakes were struck to refresh the front of core, and care was taken over the maintenance and rejuvenation of the striking platforms.

Debitage

9.14 A total of 215 blades and blade fragments were recovered from the excavations. A blade is defined as having a length at least equal to twice its width. No distinction is made here between true blades and blade-like flakes, as whilst perfectly theoretically valid to do so, it is often difficult to make such a differentiation in practice (Inizan *et al*. 1999, 131).

9.15 The vast majority of the blades retain no cortex (63.8%) or less than 25% cortex (19.0%) on dorsal surface, which indicates that laminar flakes and blades tended to be struck once the core had been decorticated and initial shaping of the core had been undertaken.

9.16 As indicated on the cores, the striking platform was carefully prepared in order to ensure the successful removal of blades. The butts of the blades and blade fragments are most often plain (30.6%) or punctiform (27.8%), but there are also relatively high proportions with linear striking platforms (22.0%). Even though there is some variation in the morphology of the butts, most were small, with a mean platform width of 5.1mm (range 1.2–13.0mm, std. deviation 2.5mm) and thickness of 1.9mm (range 0.5–5.4mm, std. deviation 1.1mm). Furthermore, there is clear evidence on the blades that the edge of the striking platform was carefully abraded in the majority of cases (56.0%), probably in order to isolate that striking platform. The vast majority of the blades have diffuse bulbs (67.8%), although there are also notable proportions of blades with moderate bulbs (27.3%). There are few with pronounced bulbs (4.3%). The generally small size of the striking platforms and diffuse nature of the bulbs is indicative of the pervasive use of soft-hammer percussion (Inizian *et al*. 1999). Excluding the cortical elements, the dorsal scar morphology on blades is overwhelming unidirectional (73.2%), with many fewer bidirectional-opposed (15.9%), bidirectional-crossed (9.8%), and multidirectional (1.2%) patterns. This supports the interpretation that core reduction involved the exploitation of a single platform cores, with rotation and subsequent setting-up of additional striking platforms occurring only once the original striking platform had been exhausted.

9.17 In general, the blade assemblage is characterised by short and narrow blades, with a mean length of 24.9mm (range 10.1–51.9mm, std. deviation 9.4mm), width of 9.1mm (range 3.14–23.2mm, and thickness of 2.7mm (range 0.6–7.1mm, std. deviation 1.2mm). Only 17.5% are classifiable as blades in the strictest sense (i.e. width ≥12mm), while the vast majority (82.5%) are classifiable as bladelets (i.e. width <12mm). Nonetheless, there is no clear bimodal distribution in the size of the blades, which suggests the strict distinction between these forms is purely analytical and indicates that they were all part of a continuous reduction of the core for the production of small blades/bladelets.

9.18 A total of 615 flakes and flake fragments were recovered from the excavations. There is little difference in the raw materials utilised for making blades and flakes. However, there are clear differences in the technological attributes recorded on the flakes. As with the blades, the butts on the flakes are most often plain (33.7%), however there are much smaller proportions with

punctiform striking platforms (9.5%). In contrast, cortical (8.2%), dihedral (9.9%), and facetted (9.2%) striking platforms, make up much more substantial proportions of the flakes. Furthermore, the flake striking platforms are also significantly larger, almost twice as wide and a third thicker on average, than observed on the blades. The flakes have a mean platform width of 9.0mm (0.1–36.1mm, std. deviation 5.4mm) and platform thickness of 2.8mm (range 0.6–10.3mm, std. deviation 1.8mm). Evidence of abrasion is also less common than observed on the blades, although is still recorded in strong relatively frequencies (40.2%). Even though there is still a reasonable proportion of flakes with diffuse bulbs (24.7%), many more have moderate and pronounced bulbs than observed on the blades (46.9% and 28.4%, respectively). The combination of larger, less carefully prepared, striking platforms, with more distinct bulbs of percussion, indicates that flakes were more often removed using a hard-hammer technique. This contrasts with the careful preparation and use of the soft-hammer technique observed most frequently amongst the blades.

9.19 There are some differences in the dorsal scar morphologies recorded on blades and flakes. There are slightly fewer flakes with unidirectional dorsal scars, although these continue to dominate the sample (64.3%). Most notable is the slight increase in the numbers of bidirectional-opposed (17.0%), bidirectional-crossed (11.5%), and multidirectional (7.1%) patterns among the flakes. Thus, it appears that flakes were more often struck during the roughing-out and shaping stages of core reduction. This is consistent with the primary objective of core reduction being the production of blades.

9.20 In general the assemblage is characterised by relatively short and squat flakes, with a mean length of 18.5mm (range 6.0–52.2mm, std. deviation 7.7mm), width of 14.3mm (range 5.5–41.2mm, std. deviation 5.7mm), and thickness of 2.1mm (range 0.6–13.3mm, std. deviation 2.1mm).

Microburin technique and related by-products

9.21 There are nine microburins (a characteristic waste product resulting from the sectioning of blades during the manufacture of microliths). Six of these remove the proximal end of blanks with the notches made at the right lateral margins. There are also two removing the distal end of blanks with the notches at the left lateral margins and one on a break with the position of the notch indeterminate due to the piece being heavily burnt. All of these are complete measuring 7.4–21.4mm long, 4.0–12.6mm wide, and 1.1–3.4mm thick. This suggests that narrow bladelets were exploited using the microburin technique. Two of the microburins have failed to propagate properly, with the flexion breaks aligned almost orthogonal with the margins. These include a microburin (SF317) that refits with a trihedral point (SF316), both from grid square P4NW (Plate 2).

Plate 2: Refitted failed microburin (SF317) and trihedral point (SF316)

9.22 A single Krukowski microburin (a remnant of a tool that has accidentally broken during retouching (Bordes 1957)) was recovered (SF259). It appears to form the tip of a drill or *mèche de foret* and provides evidence for the manufacture of tools within the immediate vicinity.

Tools

9.23 There are moderate numbers of retouched tools, which account for 8.1% of the chipped-stone assemblage. These comprise primarily microliths (43.6%), with moderate numbers of retouched pieces (19.2%) and scrapers (10.3%), and a diverse range of tools found in smaller quantities (Table 5). The spatial distribution of the tools indicates that tool manufacture and discard occurred in the immediate proximity of areas with high levels of burning (Figure 3). This supports the interpretation that manufacture, re-hafting and/or discard of tools occurred adjacent to hearths and/or that there was some form of cleaning of occupation areas between discrete episodes of activity with the refuse being discarded in hearths.

9.24 The microliths are the most pervasive tools within the assemblage. A diverse range of type are present (Table 5). Excluding the unclassifiable microliths and fragments, narrow-blade microliths, in particular small scalene triangles (40.0%), straight-backed bladelet (20.0%), and rods (10.0%) dominate the assemblage (Plate 3). There are also a number of board-blade microliths, including partially backed (20.0%) and obliquely truncated (0.5%) forms, which are generally small and poorly manufactured.

Plate 3: Narrow-blade microliths (SF221, SF227, SF276, SF292, and SF239)

9.25 Only a moderate proportion of the microliths are complete (17.6%) and a primarily analysis of the breaks suggests that a number of the pieces have impact factures consistent with having been utilised as projectiles. Further work and comparative analyses is needed to fully characterise and interpret the breakage patterns. Based on the dimensions and morphological features, the microliths are overwhelmingly made on bladelets (94.1%), although in one case a flake was utilised (2.9%) and in another a burin spall (2.9%). All are relatively small in size, with mean values of length 20.8 mm (range 14.0–36.3mm, std. deviation 8.2mm, n=6), width 5.7 mm (range 4.1–8.8mm, std. deviation 1.8mm, n=6), and thickness 2.4 mm (range 1.8–3.4mm, std. deviation 2.4mm, n=6).

9.26 Eight scrapers were recovered, including three end-scrapers, a denticulated end-scraper, a nosed end-scraper, an inverse scraper, and a fragment (Table 5). Most of the scrapers were manufactured in a relatively informal manner, which is most characteristic of the Mesolithic.

9.27 All but one of the scrapers are complete and are made on flakes, with over half retaining cortex on the dorsal surface (n=5). Most often the scraper edge was formed at the distal end (n=7), although fine retouch frequently extended down part of the lateral margins of tools. All are relatively small in size, with mean values of length 30.9mm (range 20.7–47.4mm, std. deviation 9.3mm), width 27.6mm (range 15.1–37.0 mm, std. deviation 7.1 mm), and thickness 7.7mm (range 4.7–9.4mm, std. deviation 1.7mm).

9.28 As a tool class burins are relatively rare (Table 5). They include a multiple burin on truncation (34.5 x 35.0 x 12.4 mm), a multiple burin on unretouched debitage surface (38.6 x 20.9 x 9.6 mm), and a burin on unretouched debitage surface (44.1 x39.0 x 8.6 mm).

Class	**n**	**%**
Scrapers	8	10.4
End-scraper	*4*	
Denticulated end-scraper	*1*	
Nosed end-scraper	*1*	
Inverse scraper	*1*	
Fragment	*1*	
Burins	3	3.9
On unretouched debitage surface	*1*	
Multiple burin on unretouched debitage surface	*1*	
Multiple burin on truncation	*1*	

Class	n	%
Perforators	2	2.6
Awl	*1*	
Meche de foret	*1*	
Retouched pieces	15	19.5
Blades	*5*	
Flakes	*4*	
Ind. debitage	*5*	
Burin spall	*1*	
Microliths	34	44.2
1b Obliquely truncated with additional retouch on leading edge	*1*	
1a^{c} Partially backed	*3*	
1b^{c} Partially backed with additional retouch on leading edge	*1*	
2a Isosceles triangle	*1*	
4 Convex backed	*1*	
5a Straight-backed bladelets	*1*	
5b Straight-backed bladelet with additional retouch on leading edge	*1*	
6a Rod	*2*	
7a Small scalene triangles	*4*	
7b Scalene micro-triangle	*4*	
9 Lunate	*1*	
Unclassifiable	*3*	
Unclassifiable fragments	*11*	
Microdenticulates	1	1.3
Denticulations	1	1.3
Notches	4	5.2
Blades	2	
Flakes	*1*	
Ind. debitage	*1*	
Knives	3	3.9
Miscellaneous	2	2.6
Arrowheads	4	5.2
Chisel arrowhead	*2*	
Oblique arrowhead	*1*	
Barbed-and-tanged	*1*	
Total	**77**	

Table 5: Absolute and relative frequencies of tools

9.29 A single microdenticulate, saw-like serrated blade, was recovered. It is manufactured on a blade with tiny contiguous notches along part of the right lateral edge. It retains cortex on the dorsal surface and measures 42.2 x 18.6 x 5.2mm.

9.30 There was only a single denticulate recovered from the site. It is made on blade, with a series of contiguous notches along the right lateral margin and part of the left lateral margin. It measures 37.0 x 17.1 x 5.5mm.

9.31 As a group, the perforators consist of a single awl and a drill bit. The awl is made on a bladelet, with abrupt retouch at the right margin forming a piercer at the distal end, and measures 14.7 x 9.7 x 2.9mm. The drill bit or *mèche de foret* has retouch along the entirety of the left edge and towards both ends on the right edge and measures 21.8 x 5.2 x 2.1mm.

9.32 Four notched pieces were recovered during the excavations. All but one of the notches are unbroken. There are similar numbers of those made on flakes (one), blades (two), and indeterminate debitage (one). These tools include two pieces with single unretouched notches

and two with multiple retouched notches. The tools are quite varied in terms of length (range 20.0–71.0mm, n=3), width (range 12.1–30.4mm, n=4), and thickness (range 4.5–13.0mm, n=4). The largest of these tools, SF22, has two inversely retouched contiguous notches on the right lateral margin. The opposite margin forms have a naturally abrupt angle. Pieces of this form of commonly interpreted as having been used for manufacturing and working the shafts of arrows (Plate 4).

Plate 4: Notched blade (SF22)

9.33 There were three knives recovered during the excavations. Each appears to have been made on a blade or elongated flake, with curving profile. All of the knives have retouch along one lateral margin: one on the left lateral margin and the others on the right lateral margin. There was one complete knife measuring 42.4 x 19.5 x 7.3mm.

9.34 Non-standardised retouched pieces are the second most ubiquitous tool class. There are similar frequencies of complete (53.3%) and broken pieces (46.7%). There are relatively similar numbers made on flakes (26.7%), blades (33.3%), and indeterminate debitage (33.3%). There is also one made on a burin spall. The tools range in size, although most are small, reflecting the initial size of the raw material selected for knapping. The groups have a mean length of 33.3mm (range 15.5–65.6mm, std. deviation 15.8mm), width of 16.8 mm (range 6.2–26.5mm, std. deviation 6.3mm), and thickness of 5.6mm (range 2.4–8.9mm, std. deviation 5.6mm).

9.35 Two tools could not be classified according to the established typology. One appears to be awl made on a recycled tool, possibly a side-scraper. It has abrupt scraper-like retouch along one margin and slightly concave inverse semi-abrupt retouch on the opposite margin that converge to form an awl. It measures 51.9 x 21.0 x 13.8mm. The other object is heavily worked with invasive retouch on both faces and is broadly triangular in cross-section. It is complete and measures 34.0 x 21.4 x 11.3mm.

9.36 Four arrowheads were also recovered: an oblique arrowhead, two chisel arrowheads, and a fragment of a barbed-and-tanged arrowhead (Figure 4).

9.37 The oblique arrowhead (SF241) has invasive bifacial retouch along one edge and shorter retouch along a secondary edge, converging to form a symmetrical point. There is a small fracture at the tip. It would originally have had a barb at base, but this has become detached and it is possible that the damage occurred during use.

Plate 5: Oblique arrowhead (SF241)

9.38 The two chisel arrowheads (SF87 and SF108) both have invasive retouch truncating the butt to form a triangular shape. There is a shallow retouched notch on the opposite edge in one case, which might have been to facilitate hafting of the object. Each of the chisel arrowheads has splintering along the tranchet edge consistent with use damage. In addition, one has a burin-like spall initiating from this end that has removed most of the edge of the piece. The complete piece measures 28.3 x 25.0 x 4.4mm.

9.39 The fragment appears to come from the base of a barbed-and-tanged arrowhead (SF229). It has bifacial invasive retouch, covering the entirety of the upper surface and most of the lower surface, and it appears to be the remnant of a rounded tang. A small proportion of the body of the arrowhead is retained. It has short removals along the edge, suggesting that retouch did not cover the entirety of both faces. It cannot be assigned to a particular sub-group.

10.0 Pottery

By Andrew Peachey

10.1 A single sherd (19g) of prehistoric pottery (SF216) in an abraded and friable condition was recovered from context 007 within quadrant F1SE (Figure 4). The bonfire-fired sherd has mid brown-grey surfaces fading to a very dark grey core, with inclusions of sparse grog and voids from dissolved shell (0.25–2mm), and sparse angular quartz (*c.*0.5mm). The sherd is from the base of a handmade urn, *c.*15mm thick with a basal diameter of *c.*14-16cm. No decoration of indication of vessel profile remains extant, but this type of fabric is most common on middle to late Neolithic vessels in the region, including Mortlake and Grooved Ware vessels, such as examples found at Swinhope, on the Wolds to the northeast of Lincoln (Philips and Thomas 1987, 486); although it cannot be totally discounted that such fabrics did not continue to be used for early Bronze Age Beaker/Food Vessel urns.

11.0 Bead

By Alison Sheridan and Lore Troalen

11.1 Around half of a fairly narrow bead (SF215) was recovered during processing of samples from quadrant Q4NW (Figure 4), with broad, flat, perforated faces and an outer edge that mostly curves out gently to a central rounded peak (Plate 6). In plan the bead is an irregular, sub-trapezoidal shape with rounded corners. Its dimensions are 18 x 14.5mm, with a surviving thickness of 5.1mm and an estimated original thickness of *c*.10mm. The bead has broken along a natural lamination plane, and across the perforation, revealing that the latter has a diameter of 3.35mm (increasing to *c*.4.0mm at its surviving end). Part of the outer edge of the bead is dished rather than convex, following a natural surface irregularity in the raw material (and suggesting that a pebble had been used in its manufacture). The perforation is central and perpendicular to the bead's long axis, and its internal shape indicates that it was drilled from both sides of the bead. There are no obvious traces of rilling from the rotation of the drill bit.

Plate 6: Microscope photograph of the bead

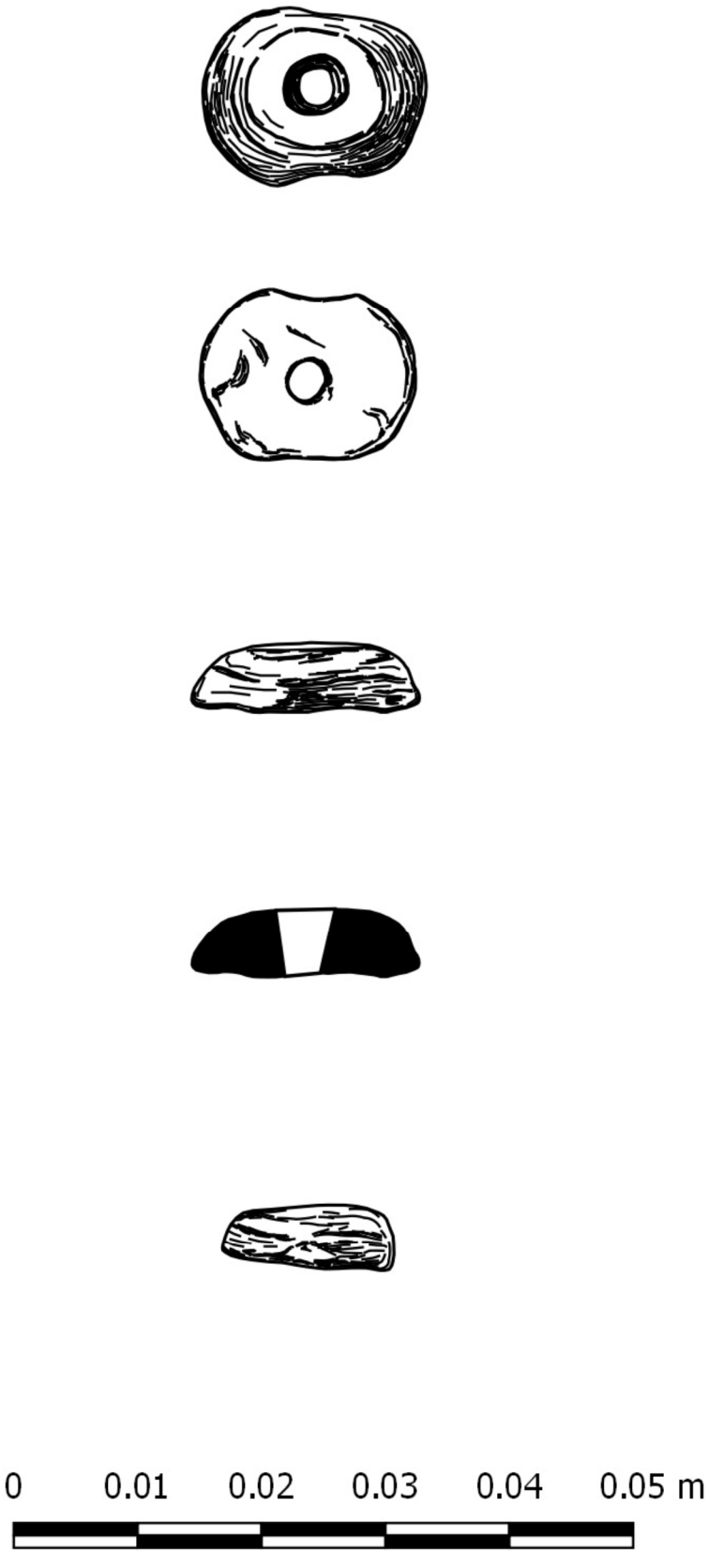

Plate 7: Drawing of the bead at scale 1.5:1

11.2 The fracture surface is matte and the external surface has a low sheen. There are faint diagonal striations on the outer edge that relate to the grinding of the bead into shape, plus several scuffs and scratches from wear and tear in antiquity and an ancient, very small flake scar, its edge ground smooth. The surviving outer end of the thread-hole is fairly crisp, and there are no obvious signs of bead-on-bead abrasion, suggesting that the bead had not seen heavy wear before it was deposited.

11.3 The raw material is a black, compact, slightly laminar stone, prone to cracking both along lamination planes and, in irregular curving lines, across the surface. Macro- and microscopically it was clear that this is not jet; the colour and texture is more characteristic of cannel coal or shale. Qualitative surface compositional analysis using X-ray fluorescence spectrometry confirmed this identification: the material contains no zirconium (a characteristic component of jet) and has a relatively high iron content, with a little calcium and traces of copper, zinc, titanium and arsenic. It is unclear whether the presence of any of the last five elements relate to contamination from the surrounding environment. Pinpointing the source of this material would require minimally destructive analysis that is beyond the scope of the current investigation.

11.4 The absence of any dateable contextual information hampers a definitive identification of the age of this bead, but morphologically its closest comparanda lie with Late Bronze Age beads. An earlier date seems unlikely as this particular shape is not characteristic of Neolithic beads, nor does it fit with the range of known Chalcolithic and Early to Middle Bronze Age bead shapes known from Britain (although, of course, it may be that there are more bead forms from these periods of which we are currently unaware). Similarly, no obvious parallels from Roman, Iron Age or later contexts immediately suggest themselves. Its broad flat sides suggest that it had been made as one of a set to be worn in a necklace, and Late Bronze Age comparanda include the five beads of cannel coal or shale found in an otherwise amber necklace from Balmashanner, Angus, in eastern Scotland. That particular necklace is likely to date to *c.*800 BC, and a broader date range for this kind of bead can be estimated at *c.*1000–800 BC.

12.0 Discussion and Conclusions

12.1 Allen Archaeology Limited was commissioned by the University of Lincoln to undertake an archaeological excavation on land at the site of the Isaac Newton building on the Brayford Campus of the University of Lincoln. Excavations were located on former marshland to the south of Brayford Pool, which expanded over a much larger area during prehistory. Previous excavations to the west of the proposed development, in advance of the creation of the Delph Pond, identified an extensive late Mesolithic/early Neolithic flint scatter (Field and Rylatt 2008), and a more recent archaeological evaluation on the footprint of this site highlighted the potential for the recovery of additional prehistoric objects (AAL2015b). The follow-up archaeological excavation which is the subject of this report was undertaken and uncovered a substantial lithic assemblage consisting of over 1800 worked lithic objects, as well as, isolated single finds of pot and a bead.

12.2 The majority of the lithic assemblage is broadly indicative of technology utilised towards the end of the Mesolithic and onset of the early Neolithic. Much of the chronologically diagnostic material provides clear evidence of later Mesolithic activity. The majority of the microliths were classified as narrow-bladed forms, which are considered characteristic of the later Mesolithic (Butler 2005). A feature of the microlith assemblage that indicates a particularly late date

towards the end of the Mesolithic is the presence of 'rod' microliths (Jacobi's class 6a). Recent research shows that this form can be firmly dated to the beginning of the fourth millennium BC (Griffiths 2014). This suggests the continuation and probable overlap of terminal Mesolithic industries with the earliest appearance of Neolithic cultures, and a period of gradual acculturation between the two entities. This would explain the apparent broad similarities observed in later Mesolithic and early Neolithic reduction strategies, including within the assemblage and in the immediate area (Field and Rylatt 2008).

12.3 Although the site was probably is use during the timeframe of the early Neolithic, it appears principally to be a Mesolithic encampment and there is no explicit evidence to indicate the occupation of the site by early Neolithic peoples: there is an absence of tools forms, such as leaf-shaped arrowheads and flint axe technology, which are considered quintessentially early Neolithic (Butler 2005, 119).

12.4 The composition of the assemblage points to a range of activities being undertaken at the site during the late Mesolithic. There were a numerous elements suggesting that knapping and tool manufacture occurred at the site. It appears that small nodules were selected for blank manufacture. The earliest stage involved roughing out and decorticating the core using a hard-hammer technique. A single platform set-up and carefully prepared in order to remove bladelets using a soft-hammer technique and a crest was occasionally prepared in order to facilitate the first removal and ensure successful removal of subsequently blanks. A range other techniques were utilised to maintain and rejuvenate the cores with evidence that *flanc de nucleus* were struck to refresh the front of the core and rejuvenation flakes were also used to modify and maintain the angle of the striking platform.

12.5 Not only were blanks manufactured at the site, but there is evidence that these were sectioned and retouched into microliths using the microburin technique. The microburin technique was utilised to remove and create a sharp inflexion at the proximal end of bladelet suitable for retouching into a variety of microlithic tool forms. Most often these were narrowblade microlithics characteristic of the later Mesolithic (see paragraph 12.2). Few of the microliths were recovered intact and primarily observations suggest that many of the broken pieces had breaks consistent with having utilised as projectiles. Thus, it appears that all stages of *chaîne opératoire,* from manufacture to discard, occurred within the confines of the excavations. Nonetheless, there is limited evidence to suggest long-term occupation at the site and the nature of lithic assemblage suggests that the site was principally a later Mesolithic hunting camp, with the dominance of microliths, rarity in other tool forms, and absence of large core tools, considered characteristic of such assemblages (Butler 2005, 116).

12.6 Excavations immediately to the northwest of the Isaac Newton development also identified evidence for a later Mesolithic hunting camp (Field and Rylatt 2008). It is plausible that these sites were occupied simultaneously, although the presence of several hearths and distinct concentrations of material within the current excavation area may signify that the location was visited periodically over several seasons. There is some evidence to suggest that there was a higher concentration of activity in the area of the new Isaac Newton Building than near the Delph Pond. In total 1,814 knapped objects were recovered from an area of 141m^2 from the Isaac Newton excavations, equating to 12.8 objects per m^2. In contrast, there were just over half a many objects per m^2 recovered from the Delph Pond excavations, with the number of pieces recorded as 6.3 objects per m^2 (Field and Rylatt 2008, 25). It is difficult to evaluate whether this reflects a genuine difference in activity intensity as the excavations methodologies differed between the excavations with a smaller 3mm mesh (compared with 5mm) and wet-sieving (compared with dry-sieving) being employed during the current excavations. The narrow mesh size of the sieve in the recent excavations could account for the increased recovery of artefacts

and this would explain the much high proportions of very small fragments of irregular waste from the Isaac Newton excavations than from the Delph Pond excavations (with 44.0% compared 21.2% of the respective assemblages consisting of debris weighing <1g). Even if the higher number of artefacts recovered per m^2 reflects increased activity in the area of the Isaac Newton excavations, the total number of artefact per m^2 remains relatively low. In either case, it is clear that the location of the site at the confluence of the River Witham and River Till was attractive to hunter-gatherer population and it is likely that populations re-visited the location as it would have provided access to a range of resources, such as fish and wildfowl, as well as plants and land mammals.

12.7 The excavations in advance of the Isaac Newton building, alongside those undertaken in advance of the Delph Pond (Field and Rylatt 2008), help to contribute to an emerging picture of regional activity during the Mesolithic, which has generally been overlooked. Excavations in the centre of Lincoln have tended not be sufficient in depth to reach deposits of potentially Mesolithic age and apart from aforementioned work alongside the Brayford Pool the only of report of Mesolithic finds elsewhere in city is from excavations in 2006 at St Catherines, Lincoln, *c.*1.7km south of the site, although results of this work are still forthcoming (pers. comm. N Field).

12.8 In the wider area evidence of Mesolithic activity has also been relatively sparse. A relatively small assemblage of Mesolithic finds was identified in advance of development at Burton Waters *c.*5km west of the Brayford Pool in the floodplain of the River Till (Trimble 1998; 1999), but more substantial of activity comes from the east of the Lincoln. Ongoing excavations in advance of the Lincoln Eastern Bypass have exposed a number of Mesolithic scatters *c.*3km east of Lincoln on the floodplain of the Witham Valley (Archaeological Project Services 2008; Pre-Construct Archaeology 2004) and evidence of relatively ephemeral activity has also been uncovered at Branston Fen (Heritage Trust of Lincolnshire 1993) and Washingborough Fen (Field and Parker Pearson 2003).

12.9 There is some evidence to suggest transient movement of people through the region during the later Neolithic and early Bronze Age. An oblique arrowhead and two chisel arrowheads were recovered. These forms are typically associated with late Neolithic assemblages containing Grooved Ware pottery (3000–2400 BC), but may have continued in use into the early Bronze Age (Green 1984). A fragment of a barbed-and-tanged arrowhead was also identified, which is characteristic of the early Bronze Age (2500–1500 BC). In addition to the handful of lithic artefacts dating from this era, a single potsherd was identified with fabric most consistent with the later Neolithic and a bead broadly morphologically comparable to others dating to the Late Bronze Age, were also recovered. The bead was relatively unworn, suggesting that it had not seen much use before it was deposited. There is no other evidence indicative of late Neolithic to later Bronze Age activities and these stray finds may have been lost or discarded during the course of transient activities in the area (e.g. gathering, hunting, fishing), rather than longer term occupation and settlement.

12.10 The insights provided by the current scheme of works into activity patterns during the prehistoric era helps to address several of the research aims outlined in the Lincoln Archaeological Research Assessment (LARA) and set out in the Research Agenda and Strategy of the Historic Environment of the East Midlands (Knight *et al.* 2012)(see Section 6.0 for overview). The results of the excavations contribute to the emerging picture of prehistoric utilisation of the Brayford Pool and the surrounding Witham Valley floodplain and, in conjunction with earlier excavations to the west of the Isaac Newton development, show that during the later Mesolithic the margins of the pool were a major focus of activities with populations revisiting the loci on a periodic basis.

13.0 Effectiveness of Methodology

13.1 The sieving methodology was appropriate to the scale and potential impact of works. It enabled the wholesale recovery and accurate location of all artefacts within the palaeosol horizon, providing evidence of former human activity in the area and addressed the research aims of the projects. This has effectively characterised the nature of local Mesolithic activity on the site and led to a greater understand of the regional character of activity during this era.

13.2 It should be noted however that on site conditions were challenging throughout the work. The fieldwork was undertaken in winter in freezing conditions, and the rising groundwater meant that parts of the site remained submerged under icy water, despite constant use of water pumps to remove standing water from the site. There were significant delays each morning whilst the pumps removed the groundwater that had accumulated overnight, and careful management of the excavation was necessary to create dams allow small areas to be de-watered and excavated once the majority of the water had been removed from the site.

14.0 Acknowledgements

14.1 Allen Archaeology Limited would like to thank the University of Lincoln for this commission. Alastair MacIntosh, City of Lincoln Archaeologist, is also thanked for his advice and encouragement during the works. Lastly, but by no means least the site team are thanked for their hard work in extremely challenging conditions.

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Appendix 1: Context Summary List

Context	Type	Description	Interpretation
001	Layer	Loose yellow gravel and hardcore, 0.17m thick; seals 002	Car park surface
002	Layer	Compact dark greyish brown sandy silt, frequent sub-angular and angular stones, extensive patches and lenses of red clayey sand, 0.76m thick; sealed by 001, seals 003	Dumped levelling deposit
003	Layer	Loose light yellow coarse limestone gravel, 0.85m thick; sealed by 002, seals 004	Dumped levelling deposit
004	Layer	Firm light brownish red clayey sand, occasional rounded pebbles, 0.55m thick; sealed by 003, seals 005	Dumped deposit, possibly associated with railway construction
005	Layer	Soft mid greyish brown sandy silt, 0.20m thick; sealed by 004, seals 005	Buried soil horizon
006	Layer	Soft dark brownish grey peat, frequent organic remains (e.g. wood, twig, leaves, etc), ≤0.75m thick; sealed by 005, seals 007	Peat formation
007	Layer	Soft mid grey slightly silty sand, occasional fragments wood, 0.08m thick; sealed by 006, seals 008	Buried soil horizon
008	Layer	Soft light grey/yellow mottled sand; sealed by 007	Natural

Appendix 2: OASIS Project Summary

OASIS DATA COLLECTION FORM: England

List of Projects | Manage Projects | Search Projects | New project | Change your details | HER coverage | Change country | Log out

Printable version

OASIS ID: allenarc1-261363

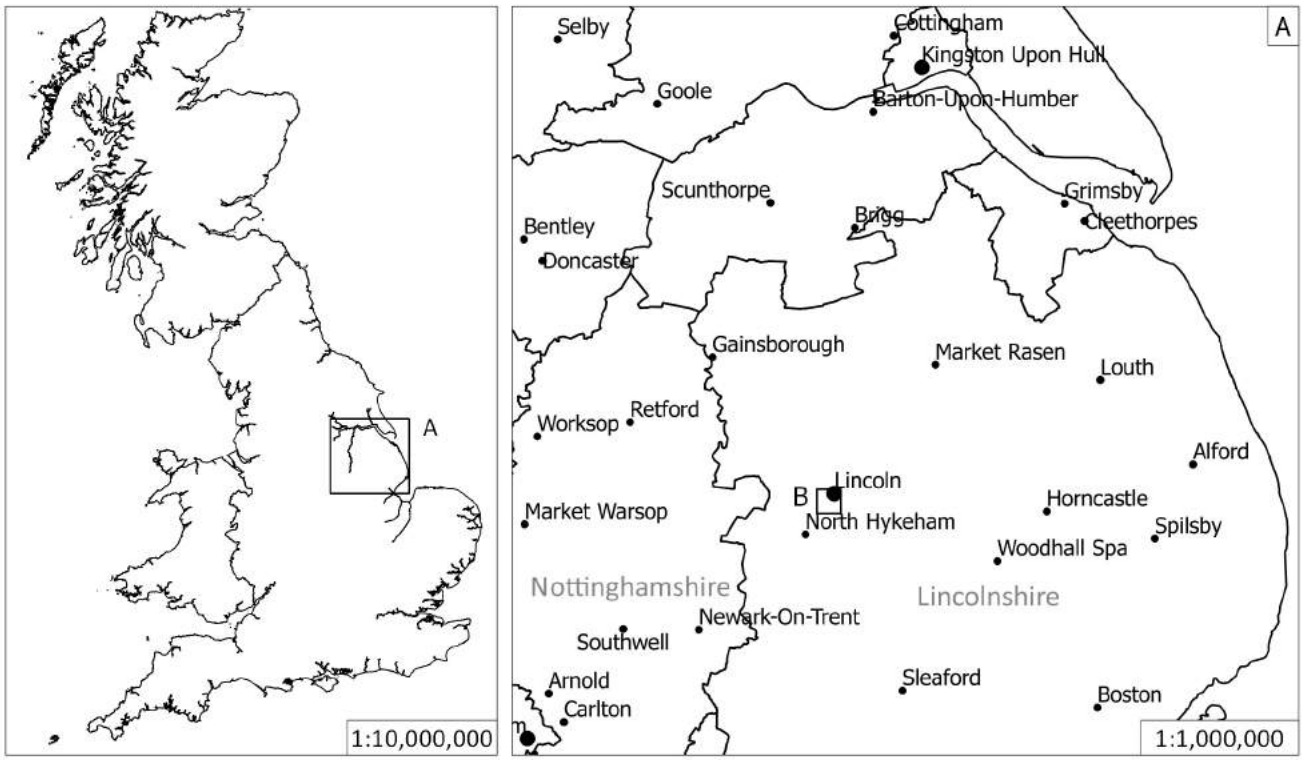
Project details

Project name	Archaeological Excavation Report: Isaac Newton Building, University of Lincoln, Lincoln
Short description of the project	Allen Archaeology Limited was commissioned by the University of Lincoln to undertake an archaeological excavation on land at the site of the proposed Isaac Newton building on the Brayford Campus of the University of Lincoln. The site is located over the formerly much larger Brayford Pool and a poolside marsh that expanded over the site in prehistory, creating a marsh environment that was present until drainage and reclamation occurred in the 19th century. The excavations uncovered a total of 1814 chipped-stone artefacts overwhelming indicative of stone-tool technologies utilised towards the end of the Mesolithic and transition with the early Neolithic.
Project dates	Start: 09-11-2015 End: 19-11-2015
Previous/future work	Yes / No
Any associated project reference codes	LUIN 15 - Sitecode
Type of project	Recording project
Current Land use	Industry and Commerce 2 - Offices
Monument type	LITHIC SCATTER Late Mesolithic
Significant Finds	LITHIC IMPLEMENT Late Mesolithic
Investigation type	"'Salvage Excavation'"
Prompt	National Planning Policy Framework - NPPF

Project location

Country	England
Site location	LINCOLNSHIRE LINCOLN LINCOLN Isaac Newton Building, University of Lincoln, Lincoln
Study area	155 Square metres
Site coordinates	497031 370979 497031 00 00 N 370979 00 00 E Point

Entered by	Chris Clay (chris@allenarchaeology.co.uk)
Entered on	5 December 2016



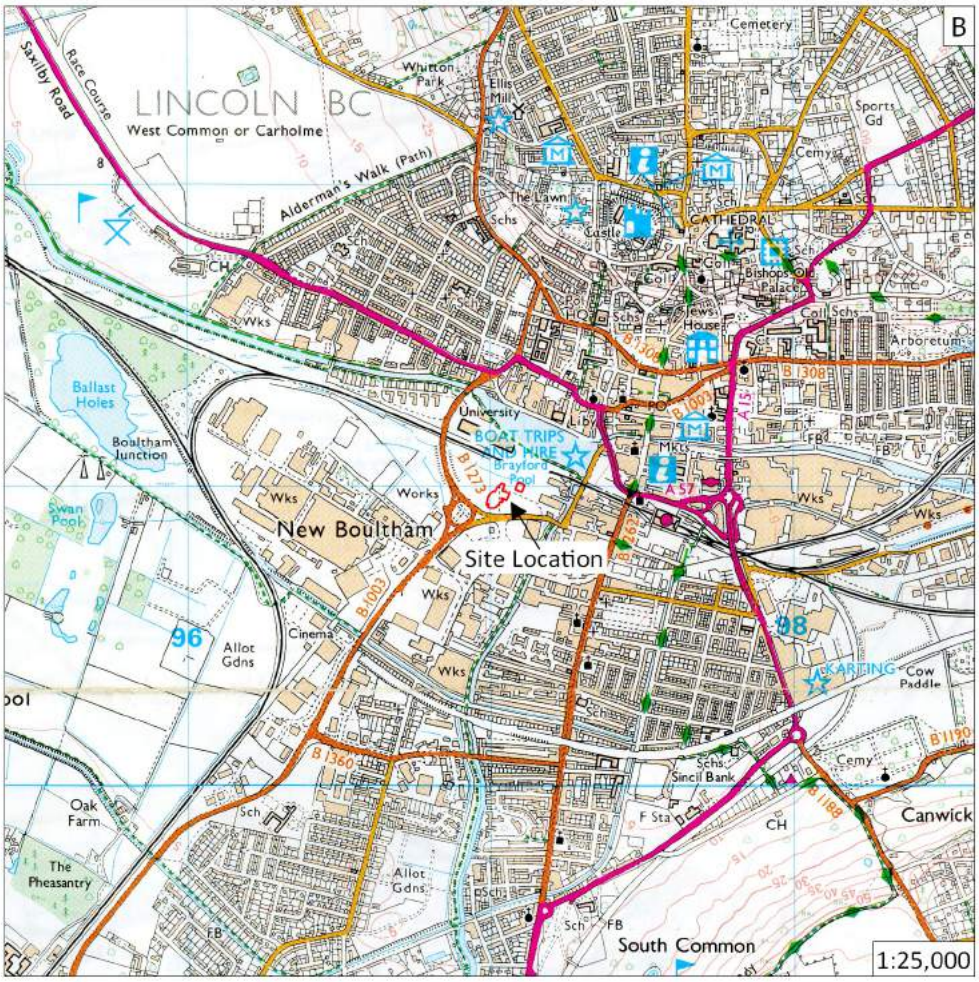


Figure 1: Site location outlined in red

Site Code	LUIN 15
Scale	1:25,000 @ A4
Drawn by	J Hogue
Date	17/08/16

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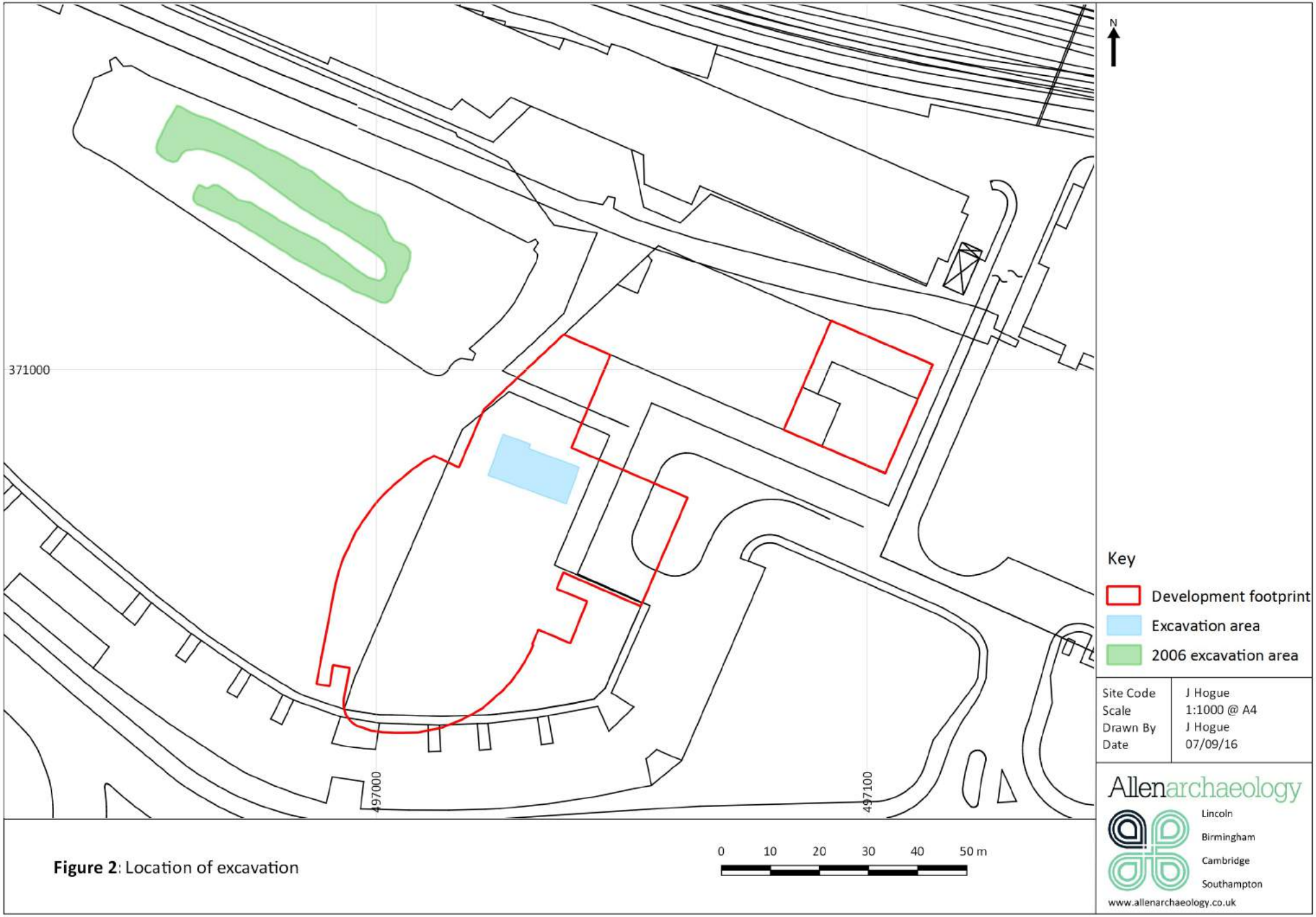

Figure 2: Location of excavation

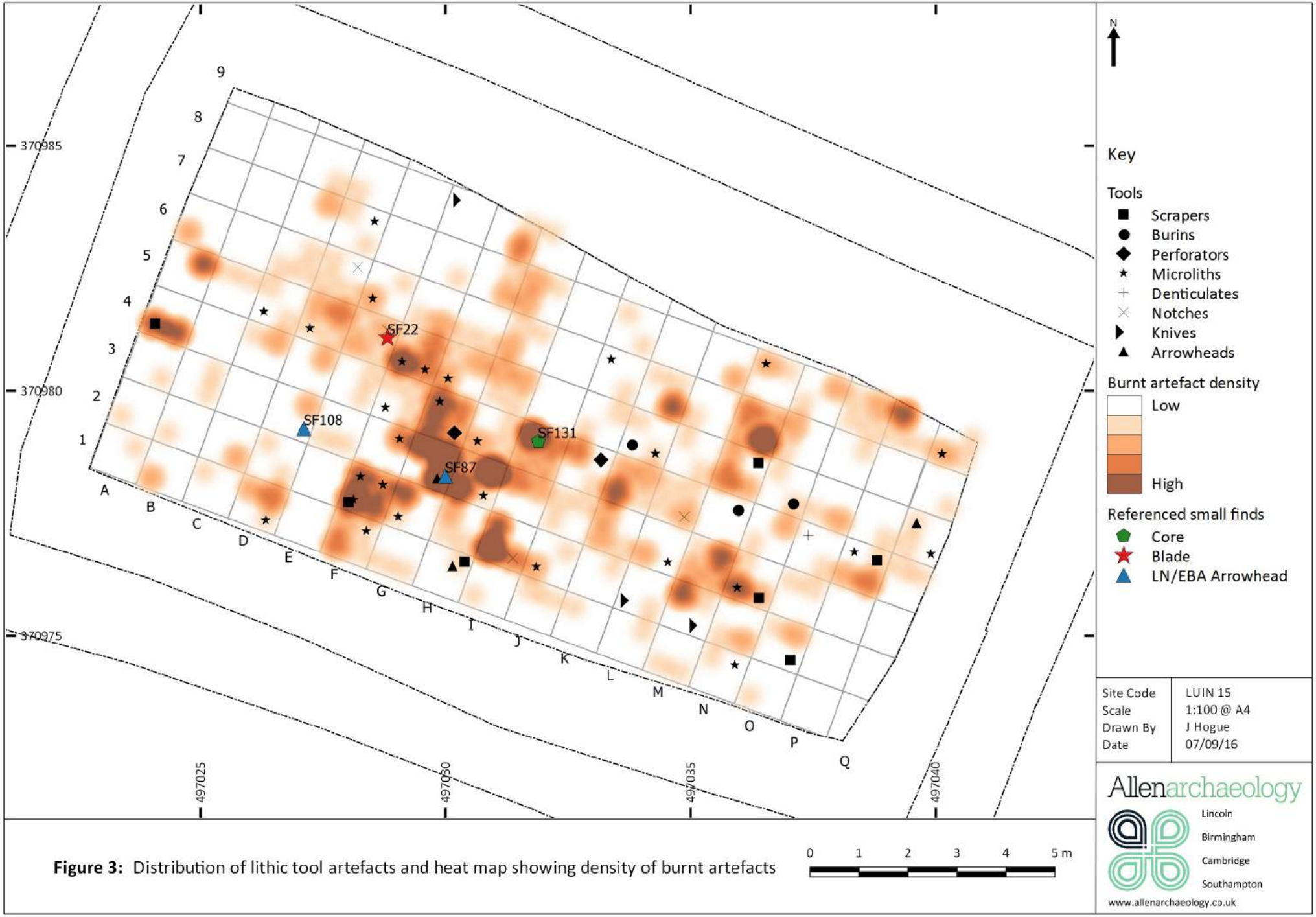

Figure 3: Distribution of lithic tool artefacts and heat map showing density of burnt artefacts

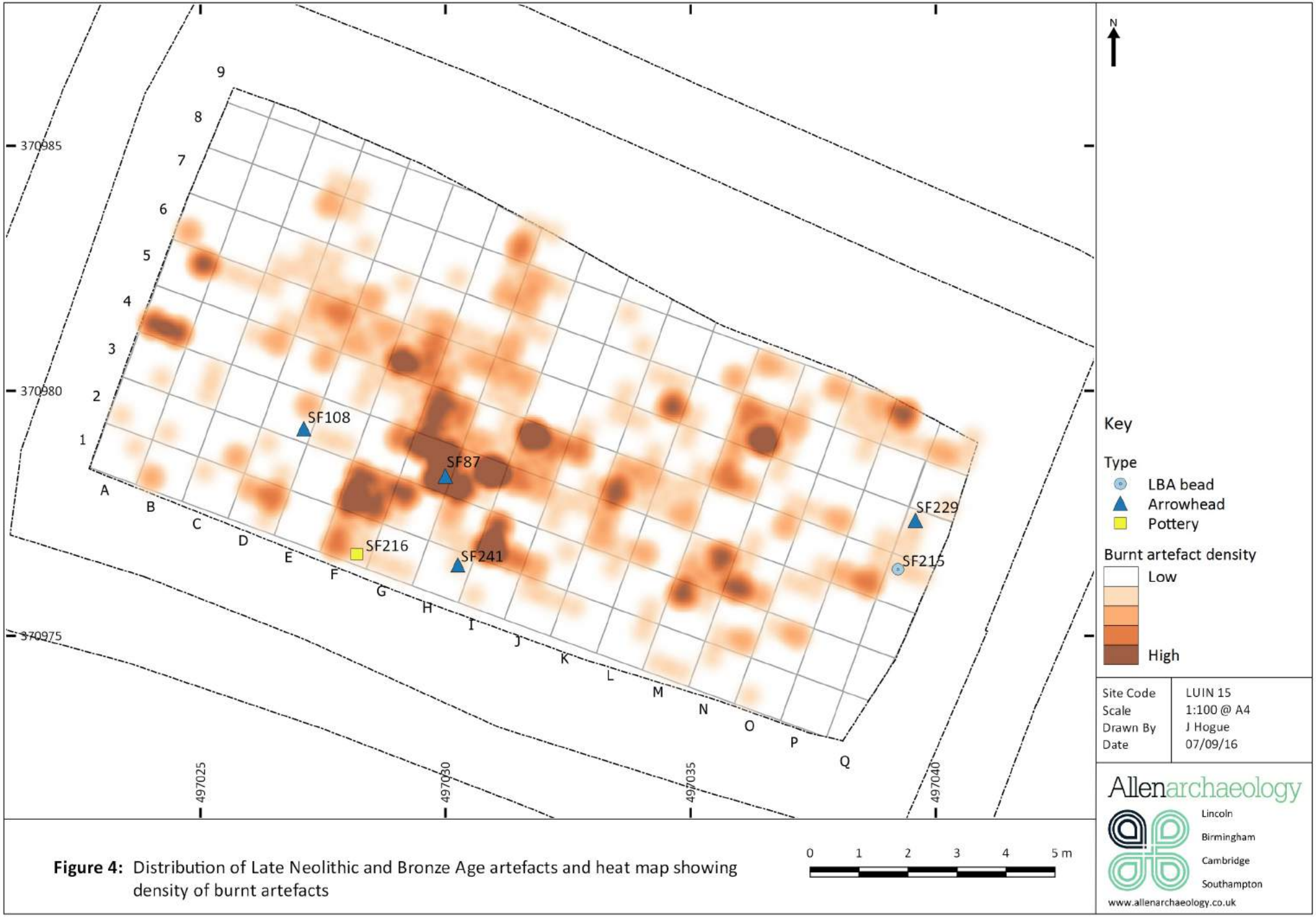

Figure 4: Distribution of Late Neolithic and Bronze Age artefacts and heat map showing density of burnt artefacts

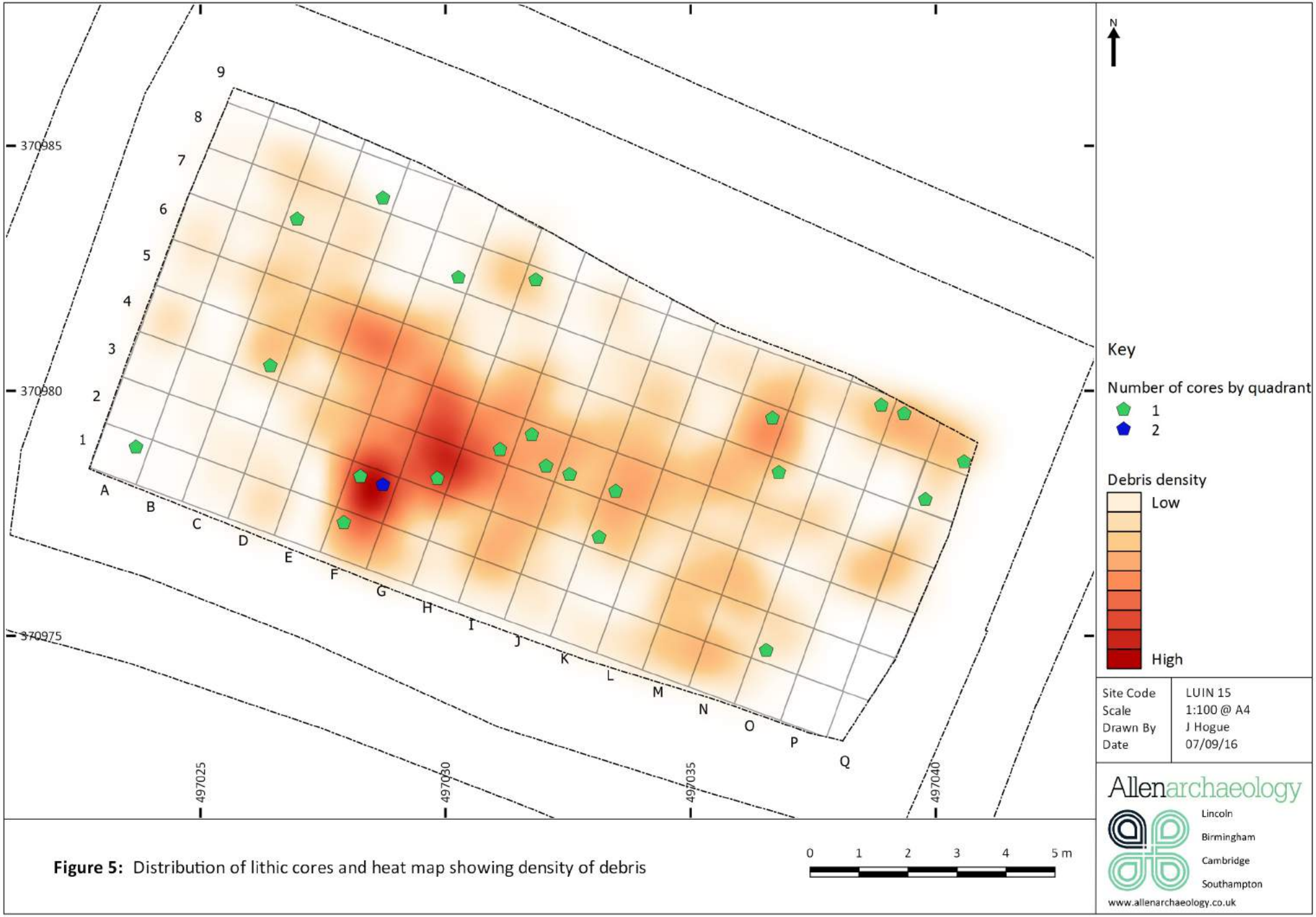

Figure 5: Distribution of lithic cores and heat map showing density of debris

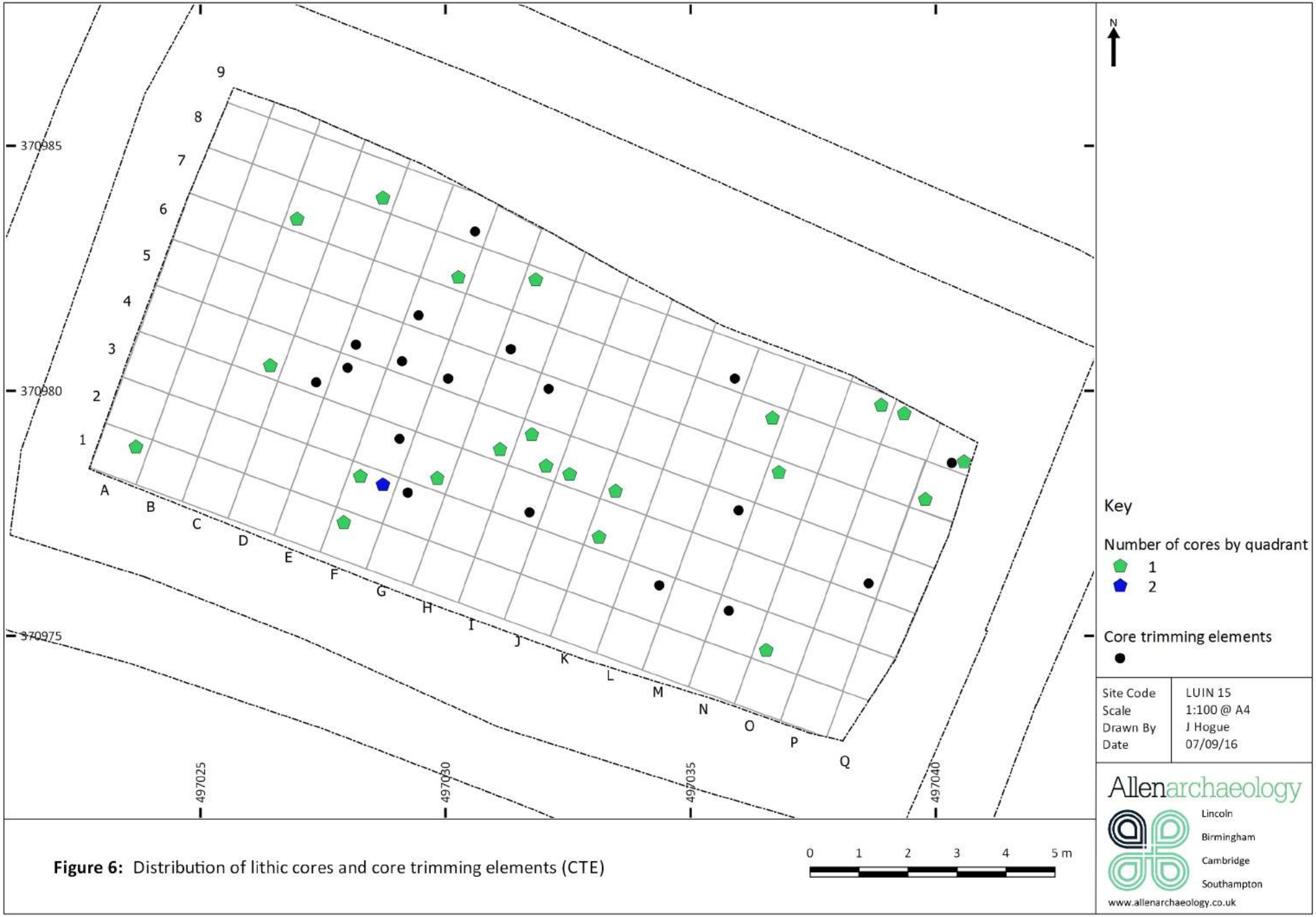

Figure 6: Distribution of lithic cores and core trimming elements (CTE)

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