93 NETTLEHAM ROAD, LINCOLN

ARCHAEOLOGICAL INVESTIGATION REPORT

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Report prepared for David Wilson Homes by

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Summary

- An archaeological evaluation was undertaken by Pre-Construct Archaeology (Lincoln) on land immediately west of 93 Nettleham Road, Lincoln. This was to assist a planning application for residential development of the site. A section was excavated through the Roman aqueduct and presumed Roman road which were known to lie just to the west of Nettleham Road.
- New light has been shed on the supposed Roman road, where it has been established that it dates from a much later period and is possibly post-medieval in origin.
- A detailed plan of the archaeology was made, effectively preserving it by record.
- Other areas of the site will fall subject to a program of observation and recording during development by David Wilson Homes.



Fig: 1 General site location

Scale 1:25 000 (O.S. copyright licence no. AL 515 21 A0001)

1.0 Introduction

Pre-Construct Archaeology (Lincoln) was commissioned by David Wilson Homes to undertake an archaeological investigation prior to access construction for a residential development on land at 93 Nettleham Road, Lincoln, Lincolnshire. These works were undertaken at the request of Lincoln City Council. This approach is consistent with the recommendations of *Archaeology and Planning: Management of Archaeological Projects* (English Heritage, 1991), *standards and guidance for archaeological field evaluations* (IFA, 1994 *as revised*) and the supplementry document *Lincolnshire Archaeological Handbook: A Manual of Archaeological Practice*, 1998.

2.0 Site location and description

The site is situated approximately 1km north-east of the city centre on the north-west side of Nettleham Road (Figs.1 & 2). It is bounded to the north and south by housing, to the west by playing fields and the east by Nettleham Road. The site is predominately flat and lies at 55m OD, centred on SK 98406 72871.

There is no drift geology in the area: the solid geology is undivided Lincolnshire Limestone (British Geological Survey, 1973).

3.0 Planning background

Outline planning permission was granted for residential development with means of access (planning ref. 2005/0787/0), subject to the undertaking of an archaeological investigation in advance of and during associated groundworks.

4.0 Archaeological and historical background

Pre-Roman evidence for archaeological activity in the vicinity of the proposed development area is scarce.

During the Roman military occupation (the first phase of Roman imperial rule, comprising the period *c*. AD60-AD90), this area would have been within the direct influence of the legionary fortress and part of the *canabae*, or informal civilian settlement outside the fortress gates.

When Lincoln became the regional capital, *Lindum Colonia*, an aqueduct was built, entering the city roughly on the line of the present day Nettleham Road. Archaeological investigations have taken place along the north-west side of this road in previous years, and during the 1970's a flat stone platform, possibly of Roman date, was discovered and thought to be associated with the aqueduct, while sections of road surface have also been found and presumed mostly to be of Roman origin. Sections of aqueduct and a road surface have been found previously at the current site and also between No's 83a-111 (Lindsey Archaeological Services, 2000).

5.0 Methodology

The investigation methodology involved monitoring the machine excavation of topsoil and subsoil deposits across an 140sqm area of the proposed new access road (Fig. 2) and also the subsequent machine cutting of a trench across an exposed road surface and Roman aqueduct (Fig. 3).

This area was reduced from the 300sqm initially proposed by the city archaeologist, with his approval, owing to site constraints, and the fact that the archaeology of the site was fully characterised within the area opened. The groundwork was carried out using a 360° wheeled excavator with a 1.19m toothless ditching bucket.

All archaeological deposits identified were subjected to excavation, in order to assess their nature, dimensions and to attempt to recover datable materials. These investigations resulted in the production of written descriptions complemented by colour photographs and scale drawings in both plan and section.

The work was undertaken between the 27th September and 16th October 2006 by Colin Palmer-Brown, Nevile Hall, Simon Johnson, Steve Williams, Wayne Livesey and Will Munford.

6.0 Results

Twelve archaeological contexts were recorded across the area of investigation (Figs. 2 & 3). The earliest was natural Limestone brash (008); this contained lenses of sand (009) within its matrix and was consistent across the site. The brash was overlain by (002), a silty clay sub-soil sealed by a mid brown/grey topsoil (001), (Fig. 7).

A north-east to south-west aligned road surface (003) was exposed over much of the area. It consisted of re-deposited limestone brash approximately 0.04m in thickness, in excess of 15.00m wide and deeply rutted over most of its surface (Figs. 4 & 5). Overlying this was (010), a mid brown silty clay which predominately contained 17th-18th century pottery sherds, several sherds of 12th-13th and 19th pottery, copper alloy objects, iron nails and horseshoes of the post-medieval period. Construction and building material dating possibly from the Roman and/or post-medieval periods was also found (see Appendix 3 & 4).

A section of the known Roman aqueduct was exposed towards the eastern limit of the site (Figs. 4, 6 & 7). A construction cut for this [012], measuring 1.00m in width and 0.33m in depth, truncated the natural limestone brash (008). The base of the cut was paved with un-worked Limestone slabs (011), which in turn were abutted by two parallel rows of un-worked stone blocks (006). These were laid in five courses to a maximum height of 0.40m and bedded together with a course mid orange sand (004) to form shuttering for the construction of the aqueduct.

The aqueduct pipe (007) was between 0.25-0.30m in diameter and fixed together with internal cylindrical terracotta collars which were similar in fabric to Roman tiles. These were joined together with mortar and finally encased in a jacket of Roman concrete *opus signinum* (005).

7.0 Discussion and conclusion

Contexts observed within the excavated area consisted of natural deposits, a Roman aqueduct and 18th-19th century road deposits.

Cartographic evidence for the road investigated has not been found on any maps of the area dating between 1722-1920 (Mills and Wheeler, 2004). Previous work conducted on the site also produce an undated rutted road surface 0.30m below the ground surface; this also overlaid the Roman aqueduct and is without doubt the same road. (Lindsey Archaeological Services, 2000).

Other supposed Roman road surfaces have been found over the preceding years along the west side of Nettleham Road, the descriptions of which are similar to that found on the current site. The dating evidence from these road surfaces is somewhat dubious, as it is based solely on either Roman style/ from construction method, or association with another undated section (Wood, 1981).

The road surface may well be post-medieval. Its relationship with the aqueduct and the artefactual material recovered strongly suggests this (Appendix 3 & 4). Its construction is poor and is atypical (generally Roman roads had cambered surfaces and flanking ditches to allow rainwater run off). The surface at Nettleham Road was relatively flat with no ditches and it would have flooded during a heavy downpour (Plate. 5). It is possible therefore that it is part of the original Nettleham Road, which may have shifted slightly east over time to its current location. The most plausible theory is that it was a temporary surface constructed to access the area during the 18th century (M Jones pers.com).

Lincoln was expanding at this time and required building stone from quarries just outside of the city, and a quarry is shown just east of the road during the mid 19th century (Fig. 7). Its poor construction and width may support this (it would have been easier to utilise the relatively shallow geology by scrapping down to its surface and, to simply when deep ruts became a problem, occasionally topping up the surface with fresh Limestone brash).

The existence of the Roman aqueduct has been known of for several hundred years and its construction and alignment well attested (Wood, 1981). The section uncovered at the present site was very well preserved, mostly due to its robust construction, but perhaps also because it was partially covered by the later road surface. Several theories have been made about its extent, use and capabilities. Its source is commonly thought to be that of the Roaring Meg spring, 1km to the north. From here it has been projected on a north-east alignment along Nettleham Road, before entering the city. Its sealed construction method was to enable the water to become pressurised, thus allowing it to be transported uphill, some 20m higher than its source, from where it may have fed the public baths or possibly a header tank for further distribution. Its size is thought to have been insufficient to have coped with much more than this. There is some suggestion that it never worked at all due to the absence of limescale deposits within it (sections recovered from the current site would support this).

8.0 Effectiveness of methodology

The methodology required the overburden within the main area of investigation to be reduced by machine down to the depth of archaeological deposits, with hand cleaning to follow. This ensured that the archaeological remains encountered were relatively undamaged, and this enabled detailed and accurate recording of the archaeology, and a full interpretation.

The works have effectively preserved the road by record and mitigated any further works for the new site access. The remaining area of the development is to be subjected to watching brief conditions.

9.0 Acknowledgements

Pre-Construct Archaeology (Lincoln) would like to thank David Wilson Homes for this commission. Thanks also go to Ed Lewis at the Historic Environment Record, Lincoln and the groundworkers for their cooperation during the fieldwork.

10.0 References

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11.0 Site archive

An archive of written, drawn, photographic and object elements is in preparation and will be deposited at the Lincoln City and County museum within six months of the completion of this report.

Access can be gained to it by quoting the L.C.C. Museum accession number 2006.247



THIS ILLUSTRATION COULD NOT BE FOUND WHEN THE RECORD COPY WAS ASSEMBLED.

+ 0.00 mRoad Surface II. **6** Road surface showing rutting and relationship with Roman aqueduct Ξ \Box_{i} 20.00 P 000 -------г-т L <u>e.</u>eg 0⁴ 4⁵ .. ג בב Approximate Limit of Road 1 80.00 1 80.00 1 Natural ī (008) 00,33,000 . 8 $15.00 \text{m} \div$



Fig. 4

5m

Scale 1:50

0



Fig.5

Not to scale





Detail of aqueduct

Scale

1m

0



Fig. 7

Appendix 1: List of contexts

- **001** Dark grey/brown topsoil 0.30m in thickness with occasional charcoal flecks and fragments.
- **002** Light brown silty clay sub-soil, 0.05m in thickness with occasional charcoal flecks.
- **003** Metalled surface consisting of re-deposited Limestone brash, 0.05m in thickness.
- 004 Mid orange course sand, bonding for context (006).
- 005 Light pink concrete, 0.35m in thickness with frequent CBM inclusions.
- **006** Unworked Limestone blocks, shuttering for (005).
- **007** Terracota water pipe, 0.21m x 0.21m with a thickness of 0.35m and encased in (005).
- **008** Limestone brash in excess of 0.20m in thickness and extending across the entire area under investigation.
- **009** Dark orange/red clayey sand 0.40m x 1.80m in size. Natural lens of sand within (008).
- 010 Mid brown silty clay, 0.10m in thickness. Infill of cart ruts on (003).
- 011 Flat Limestone slabs 0.06m x 0.40m x 0.40m. Bedding layer for (005).
- 012 Cut 0.35m x 0.35m. Foundation trench for (005).

Appendix 2: Colour Plates



Plate 1: Site view, showing road surface looking north-west.



Plate 2: Site view, looking southeast.



Plate 3: Road surface, looking north-west.



Plate 4: Road surface showing ruts, looking north-east.





Plate 9: Aqueduct showing flanking stone shuttering, looking north-east.

Plate 10: Aqueduct showing shuttering courses, looking north-east.



Plate 11: Aqueduct showing method of joining the sections of pipe together.



Plate 12: Aqueduct showing foundation layer, looking southwest.

Appendix 3: Metal finds and Roman aqueduct pipe.

The Metal finds.

Alan Vince and Kate Steane

A small group of metal finds from an excavation at Nettleham Road, Lincoln, conducted by Pre-Construct Archaeology (Lincoln) Ltd was submitted for identification and assessment.

The finds come from the surface of a rutted road, context 10. The road was thought initially to be of Roman date but appears in its final phase of use to be 18th century, although it could well have Roman origins.

Description

Copper Alloy

Seven copper alloy objects were recorded.

A strand of wire twisted around to produce a loop at one end. It may have been part of a hook and eye fastening.

A broken fragment of cast buckle.

A fragment of a cast buckle pin.

A strip of sheet metal, 10mm by 6mm, with two punched holes.

A dome-headed tack.

A fragment of the side of a thimble of bell-shaped form. The impressions are simple dots.

A fragment of wire, 2mm diameter.

All of these objects appear to be of post-medieval character, although none can be precisely dated.

Iron

Three horse shoes were recorded. Two are complete, 120mm front to back and 115mm across and 115mm front to back and 120mm across. The third shoe fragment appears to have been of similar size. The shoes vary between 16mm and 30mm wide and are probably all of post-medieval date.

Lead

A single fragment of lead shot was recorded. It is 9mm diameter and weighs 1gm.

Assessment

Date and Interpretation

The metal finds are consistent with the pottery in suggesting a post-medieval date for the road surface.

Retention

The finds come from a stratified deposit and should therefore be retained for future study.

Appen	dix 1		_	_				~
Context	class	Description	Form	Part	Nosh	NoV	Weight	Condition
010	СОРР		BUCKLE	FRAG	l	l	1	
010	COPP	SPHERE 9 DIA	SHOT	BS	1	1	1	
010	COPP	TRIMMED STRIP 10 BY 6 WITH 2 HOLES 2 ACROSS PUNCHED THROUGH	FITTING	BS	1	1	1	
010	COPP	15 TALL, TRACES OF VERTICAL ROWS OF INDENTATIONS	THIMBLE	BS	1	1	1	SQUASHED FLAT
010	COPP	FINE TWISTED WIRE WITH LOOP	?	BS	1	1	1	
010	COPP	PIECE OF WIRE, JUST UNDER 2 DIA	WIRE	BS	1	1	2	CRUMPLED
010	COPP	OVAL HEADED	TACK	BS	1	1	1	
010	COPP	CAST SOLID	BUCKLE PIN	BS	1	1	1	SQUASHED
010	IRON	115 LONG	PMED HORSESHOE	BS	1	1	183	SLIGHTLY TWISTED
010	IRON	120 LONG	PMED HORSESHOE	BS	1	1	258	TWISTED
010	IRON	PART OF A HORSESHOE	PMED HORSESHOE	BS	1	1	141	

The Roman Aqueduct Pipe.

Alan Vince

Excavations at Nettleham Road, Lincoln, by Pre-Construct Archaeology (Lincoln) Ltd revealed a section of the Roman aqueduct. A collar from the aqueduct pipe was removed for further study and sent to the author for an assessment of its potential.

Description

Form

The collar is approximately cylindrical and c.134mm external diameter. It was formed from a sheet of clay, formed on a sanded mould and then wrapped into a

cylinder. It was then joined to the wider body of the aqueduct and extra clay applied to lute the two together. The end of the collar was knife-trimmed and then the pipe was fired. The colour and hardness suggest that the aqueduct was fired in an oxidizing atmosphere to a temperature in the order of 900-1100 degrees C. This estimate is based on the colour and hardness of test briquettes of similar Jurassic clays made by the author ({Vince 1984 #103}).

Fabric

The fabric of the aqueduct consists of poorly mixed lenses of red-firing and lightfiring clay, in which the red-firing clay predominates. In firing, the core of the object has reduced, to a light blue-grey. The clay contains abundant subangular and rounded quartzose sand, with few grains larger than 0.5mm.

Use

Before being cemented to the next pipe, the collar was roughly chipped at the end, removing c.5mm of clay. Presumably, this was because of an obstruction in the pipe it was to fit into. The collar was then coated in a mortar containing an aggregate composed of a mixture of coarse quartzose sand and tile chips, similar to that found in Opus Signinum.

A deposit of light brown material formed in the bottom of the pipe and had crept into a void between the collar and the extra luting which joined it to the main pipe as well as overlying the mortar forming a stain stretching c.60mm from the pipe end. This deposit is probably "fur" formed by the pipe in use. However, it it nowhere more than 0.5mm thick.

Assessment

Source

The visual characteristics of the aqueduct are similar to those of Roman tiles produced from Middle Jurassic clays from the dip slope of the Jurassic scarp. The light-firing lenses in particular are probably derived from either the lower or upper estuarine beds. The former outcrop on the scarp slope, along Lincoln Edge, and were utilised for the production of white-firing pottery at South Carlton. The latter seem to form less substantial beds and are utilised only, as in this case, in variegated red/white ceramics such as those produced in the tilery at Washingborough. Tile waste found on the opposite side of the Witham, at Fiskerton, may indicate the presence of a second tilery or have been carried across the river for use as hardcore (the waste came from the surface of a track leading down to the river).

Use

The functionality of the Lincoln aqueduct has been questioned from an engineering perspective. The aqueduct could not work by gravity, since the Roaring Meg source is at a lower level than the stretch of aqueduct in Nettleham Road and certainly lower than the supposed collecting tank at East Bight. It therefore must have been designed to work using a vacuum or perhaps a pump system ({Jones, Stocker, et al. 2003 #44973}, 00). Because of the technical difficulties, it has been suggested that it may not have been successful. The deposit of "fur" on the collar certainly confirms that the pipe contained water. However, the extreme thinness of the deposit does suggest that the volume of water carried along the pipe was limited, and it would

have been possible to achieve the observed degree of "furring" simply by groundwater percolating through the pipe in the 1800-odd years since the aqueduct was built.

Possible Further Research

The source of the clay used to make the aqueduct could be confirmed by chemical analysis of the clay. However, this would also require the collection and analysis of samples of tile from the Washingborough tilery and the Fiskerton waste deposit.

A total of 13 samples would be required in order to determine whether the pipe was produced at either tilery (and indeed whether there is any difference in fabric between the Washingborough and Fiskerton tile).

A single thin section of the fabric would be required to confirm the identity of the clay used to produce the collar.

Appendix 4: The Pottery and Construction and Building Material.

Jane Young.

In total twenty nine sherds of pottery were found throughout the excavated area. These mostly comprised of 17^{th} - 19^{th} century black and brown glazed wares, there was also a single sherd of 13^{th} - 15^{th} century Toynton Ware.

Forty eight fragments of construction building material were examined from the site, eight were identifiable as crushed Roman brick, five were fragments of 12th-13th century tile. The remaining fragments may be of Roman or possibly post-medieval origin.