

GEOPHYSICAL SURVEY: THERFIELD HEATH LONG BARROW.

GPR AND RESISTIVITY SURVEYS



SITE CODE: TH 18

NGR: TL 34151 40166

LIST ENTRY NO: 1010428

LANDSCAPE DESIGNATION SAM 20635

Roy Loveday, Oliver Harris, David Field and Dominic Escott

ACKNOWLEDGEMENTS

The authors are very grateful to the Conservators of Therfield Heath, English Nature and the Therfield Heath Golf Club for allowing us to carry out this survey. They are also grateful to Emily Banfield and Stuart Eve for their assistance with the work.

INTRODUCTION

This report presents a programme of geophysical survey undertaken at the site of the Therfield Heath long barrow, Royston, Hertfordshire (TL34151 40166) in November 2018. The survey comprised ground penetrating radar (GRP) survey and resistivity survey.

The work was undertaken as part of a wider-ranging project: *Characterising Survivors, Explaining Absence: a survey of Midland and East Anglian long barrows* (Loveday *et al* 2018). The Therfield Heath long barrow is a scheduled monument therefore Section 42 consent was applied for and granted (case no. SL001153087) by Historic England (East of England Office).

PROJECT BACKGROUND

Site location and landscape development

Therfield Heath is uncultivated common land sited on a spur of the Chiltern chalk escarpment overlooking the valley of the River Cam. It is a biological Site of Special Scientific Interest and a local nature reserve that is also used as a golf course.

In addition to the long barrow there are ten well preserved round barrows on the Heath, six closely clustered 100m north of the earlier

monument (Herts 17 SAM 20632 and 20641) and one just 30m to the west (SAM 20640) and others have been ploughed out (eg Beldam 1861). A lynchet situated less than 10m north of the long barrow and aligned along the contour can be traced for almost 100m (1031090). Early 'Celtic' fields survive on the west of the common where they are overlain by ridge and furrow and there are occasional field banks along the northern escarpment that may also be of an early phase. Relatively narrow ridge and furrow cultivation, probably Napoleonic in date, similarly overlies the lynchet north of the long barrow as well as the long barrow ditch itself. Surface quarries are widespread on the common, evidently for flint and can be observed to cut the ridge and furrow (Crawford 1936, 104-5): examples fringe the long barrow to the northwest, south and southeast (RCHME 1:2500 plan. NAR no --- Cat 832777).

Archaeological background

The long barrow is placed at 117m OD just below the highest point of the heath; it would have been skyline sited when viewed from the Cam Valley to the north. It is aligned slightly north of east an orientation that respects the contours of the local topography. It is trapezoidal in plan: 38m long x 26 m wide at the eastern end; 15.5m wide at the western end. It slopes from a height of 2.2 m at the east to just 1.7m (crest)/0.6m (skirts) at the west. Ditches flanking the mound survive to north and south. The north ends in a well-defined terminal in the east but further west is interrupted by ridge and furrow and cannot be traced. The southern ditch terminal is also quite clear and despite the presence of ridge and furrow can be

traced further west than the northern ditch averaging some 3m in width and 0.25m deep.

In 1855 the barrow was excavated by E.B. Nunn of Royston who opened a trench c2m wide along its entire length (crest only to judge from aerial photographs) 'extending to the base of the hill'. On that base some 4 - 5m from the eastern end he found a bank of flints running at an angle (NW – SE) to the axis of the barrow. Just west of the centre of the site were two 'cysts' (pits) dug into the chalk and placed axially 5.5m apart. Both were reported to have been some 0.45 – 0.50m in width x 0.6m in depth and 'containing ashes'. About 0.6m further west a pile of bones was encountered, Nunn referring to them as 'a skeleton' but '...the bones being placed in a kind of heap or circle' suggests a disarticulated group. In addition to these basal features a cremation deposit accompanied by pieces of iron and a few flints was located c 0.30m from the top of the mound at its eastern end, and an extended inhumation with crossed legs at a depth of 1.20m, 6 - 7m further to the west.

C W Phillip's (1935) excavation in 1935 relocated the latter secondary grave from which he recovered an Anglo-Saxon spearhead. Perhaps influenced by his recent excavation at Giants Hills 1, Skendleby (Phillips 1936) he suggested that it was clear that a ditch encompassed the barrow. This is not observed on the surface today. Phillips was a skilled fieldworker but he does not mention earthworks or ditch measurements. Only the southern ditch is marked by contour returns on his plan (ie exactly where it can be seen today) while the northern ditch straddles two of his contour divisions. The bulge in the ditch depicted at the northwest end on his plan has now been demonstrated to be a flint extraction hollow (RCHME TL 34 SW 49).

Phillips cut two transverse trenches across the barrow, one near its midpoint and the second close to the narrow western end both of which reached to the ditch at either side. Smaller trenches were opened just beyond the eastern end to test the relationship between a later ditch and the long barrow ditch, both of which were evidently visible as slight earthworks. The long barrow ditch where sectioned proved to be only some 1.5 - 2.4m wide (1.2m wide at the base) and 1.2m – 1.6m deep. It had been used simply to furnish capping material for the mound that excavation demonstrated had been constructed of turf. His trenches at the east end were intended to investigate the relationship of a later ditch with that of the barrow. However, it revealed ditches of different profile in each. In one, that interpreted as the long barrow ditch was only 0.6m wide at the base (some 0.3m narrower than the comparably profiled long barrow ditch in section B), while the other (G) was characteristic of sections A, C and D. The secondary ditch varied from a quite steep sided cut that 'showed a strong hint of a post' within its fill to a broad scoop where it intersected the barrow ditch; both were about a metre deep (Phillips 1935, fig 3).

From earthwork evidence and his ditch sections Phillips plotted the course of the long barrow ditch as an uninterrupted oval. That has remained the accepted plan despite the fact that aerial photographic evidence (eg. NMR 23354/34) suggests a more trapezoidal plan akin to the ditch plan of Haddenham, Cambs. (Evans and Hodder 2006). That is also the conclusion of field observation noted above. Aerial photographs also record the scar from Nunn's axial trench and demonstrate that his claim that it extended the full length of the barrow is incorrect. It extended along the crest of the mound only.



GEOPHYSICAL SURVEY

Standards

The surveys and subsequent reporting were carried out in accordance with English Heritage's guide to Geophysical Survey in Archaeological Field Evaluation (2008), the IfA's Standard and Guidance for Archaeological Geophysical Survey (Draft) (IfA, 2010) and the ADS' Geophysical Data in Archaeology: A Guide to Good Practice (Schmidt, 2001).

Field methods

An overall survey grid was established using tapes, this grid was subsequently surveyed using dGPS. Data collection was carried out using a standard methodology, with all grids walked in the same direction (N-S), in a zig-zag traverse pattern. A standard grid size of 20m² was used for resistivity survey and a single grid, 40m by 60m was used for the GPR.

Resistivity survey

An RM85 resistance metre, in parallel twin probe array mode was used to conduct the survey. The transect interval was 0.5m and sample interval was 1.0m. Unfortunately a technical problem prevented completion of the survey in the time available.

GPR survey

The GPR survey was carried out using a GSSI Utility Scan dual antenna machine.

The traverse interval was 0.5m, with readings being taken to a depth of 3m. The readings were automatically logged at 0.025 m intervals, giving a resolution of 400 readings per 10 m linear traverse.

Data processing

Geoplot software was used to download and process the resistivity survey data. Greyscale plots of both raw and processed data were produced in Geoplot.

The 'raw' data has been subject to minimal editing to remove operator error, with data subsequently processed to remove geological and background biases and interpolated to aid interpretation.

GPR data was processed using GPR Slice for processing. This included reversing alternate lines, so the data shows as zig-zag. The full raw dataset is held in the digital archive for this project.

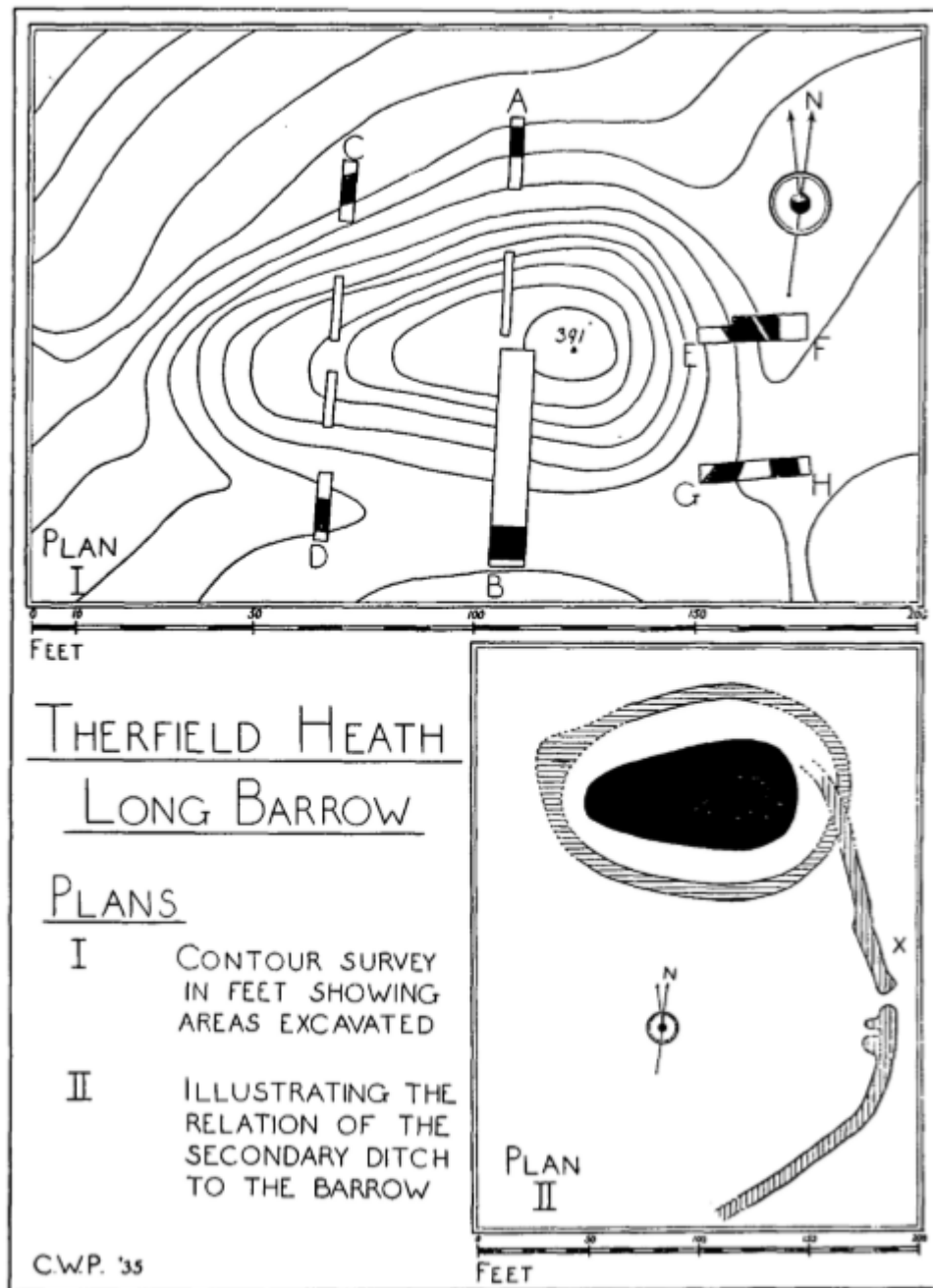


Fig. 1. Plans of the Royston long barrow and of its immediate neighbourhood.

Fig 1. Phillips 1935, fig 1.

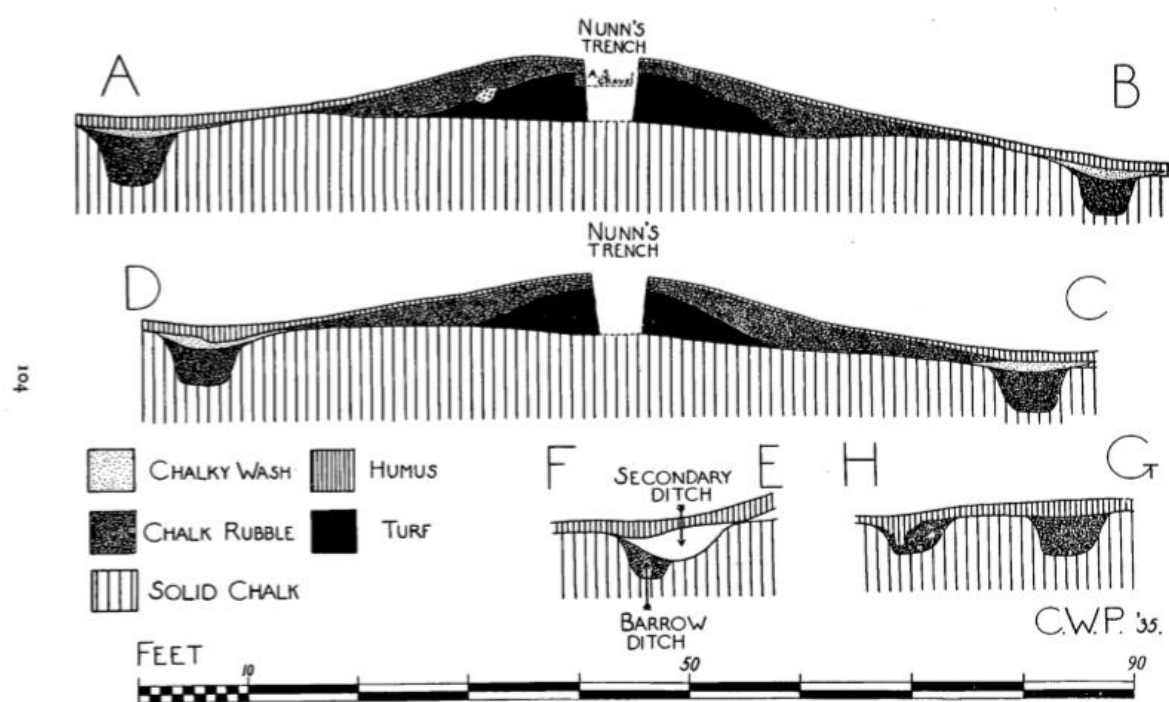
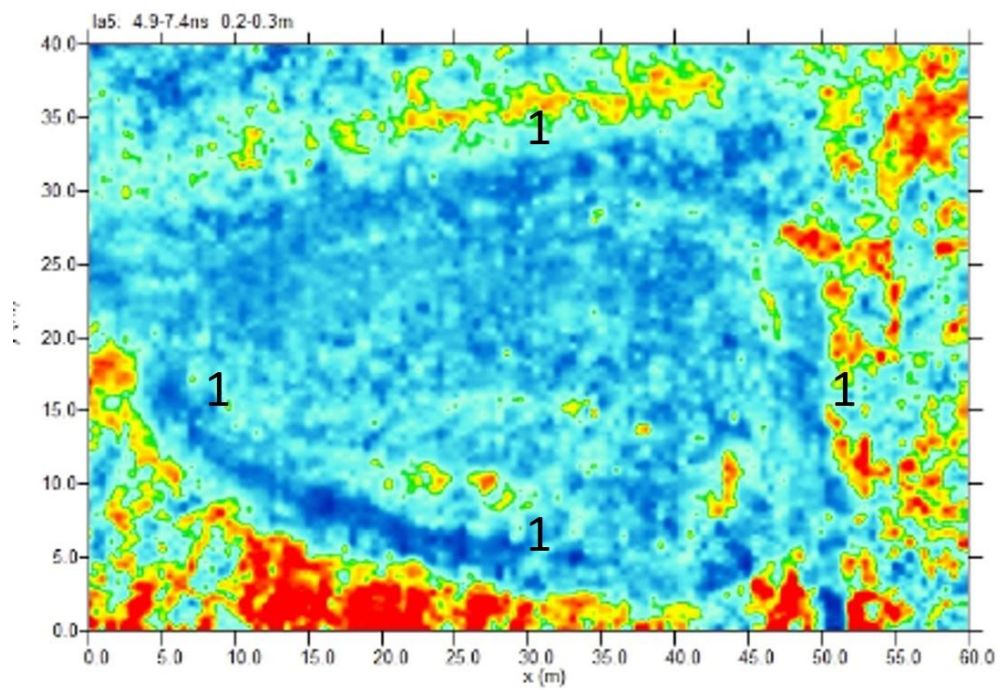


Fig. 3. Sections of the Royston long barrow and ditches

Fig 2. Phillips 1935 fig 3. Sections

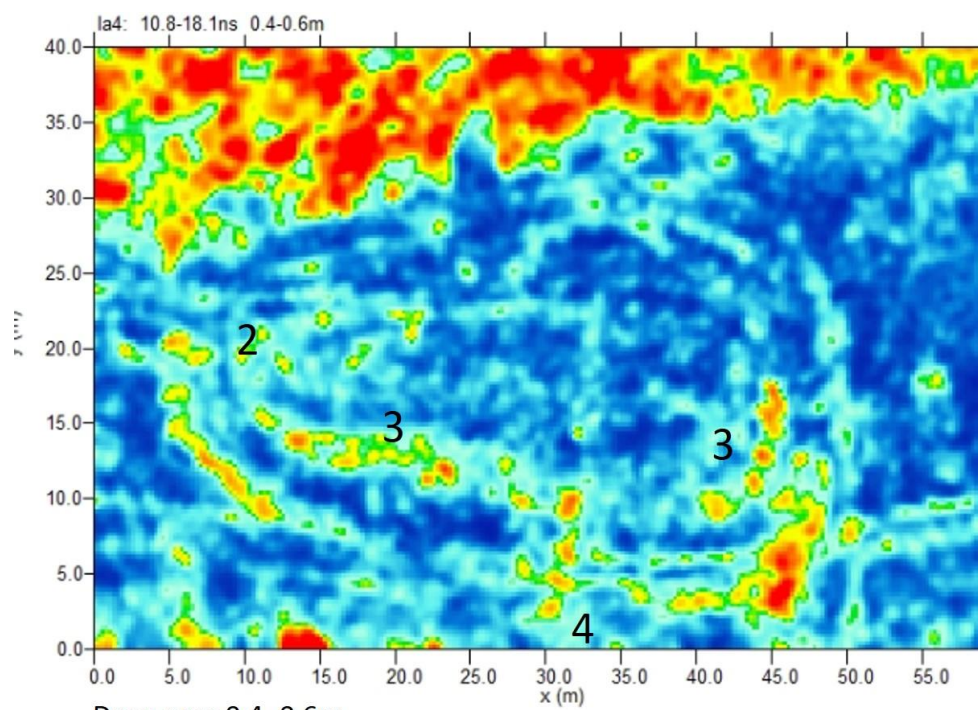
Note that Phillips shows section A as higher than section B in his longitudinal section, but the opposite in his plan. The fact that ditch section A is clearly wider than ditch section B also conflicts with the dimensions shown in plan. It seems he confused the orientation of his A – B section; ditch plan would be more difficult to mistake.

This is important largely because the rise in the underlying chalk surface close to the ditch at B must lie on the north, not the south, side of the barrow (see below – mound interior results)



Shallow pass 0.2 – 0.3m

Fig 3a.



Deep pass 0.4 -0.6m

Fig 3b.

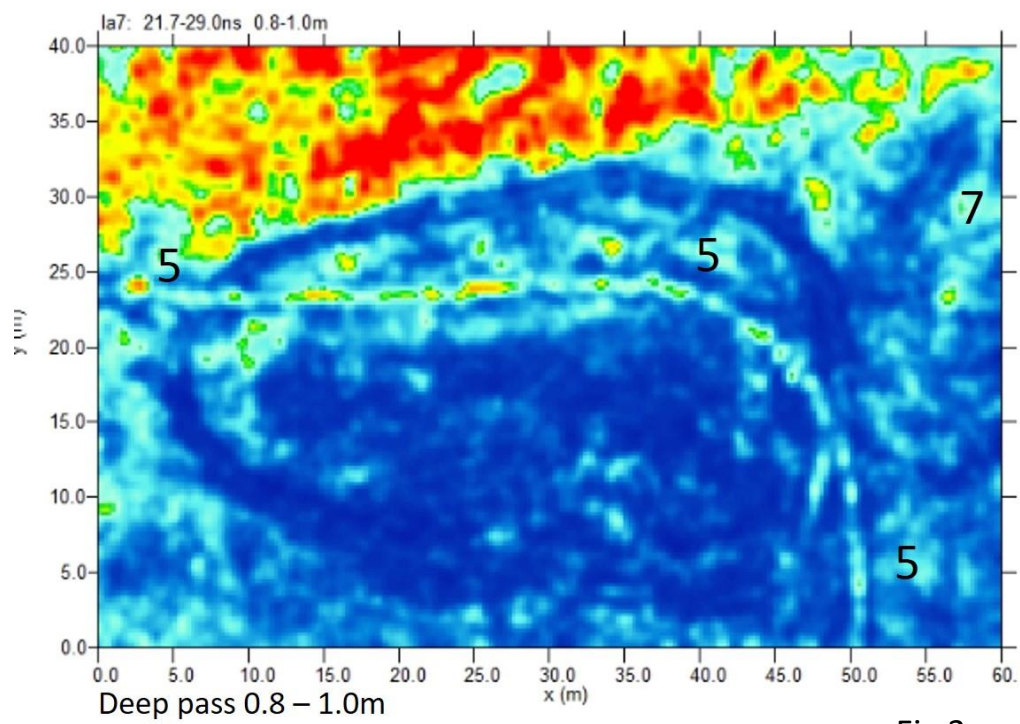


Fig 3c.

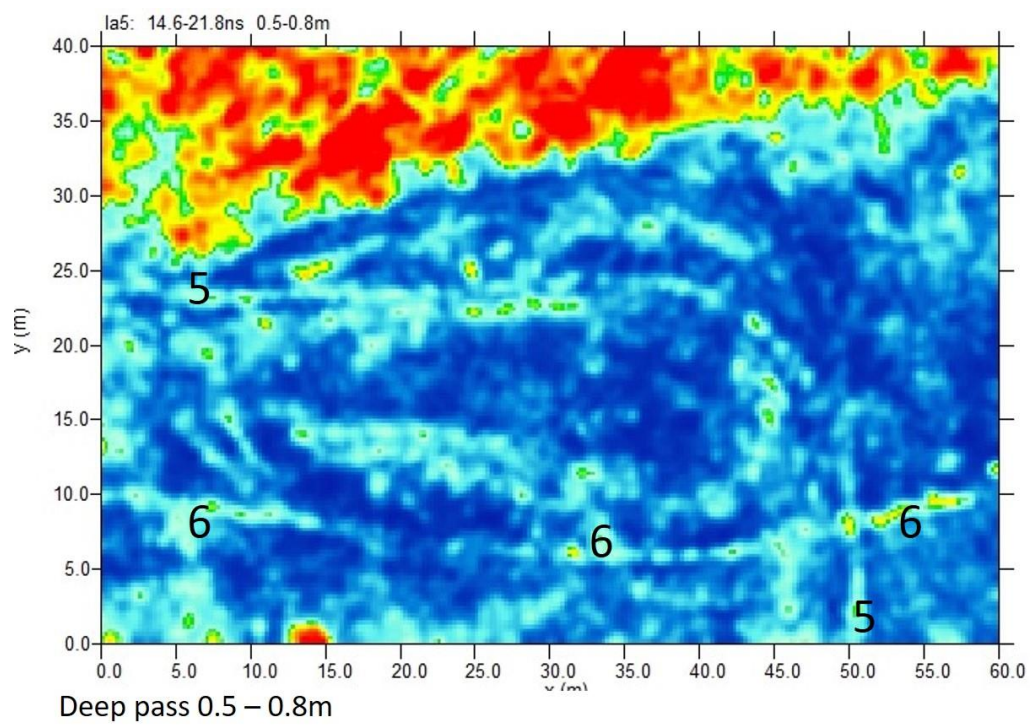


Fig 3d.

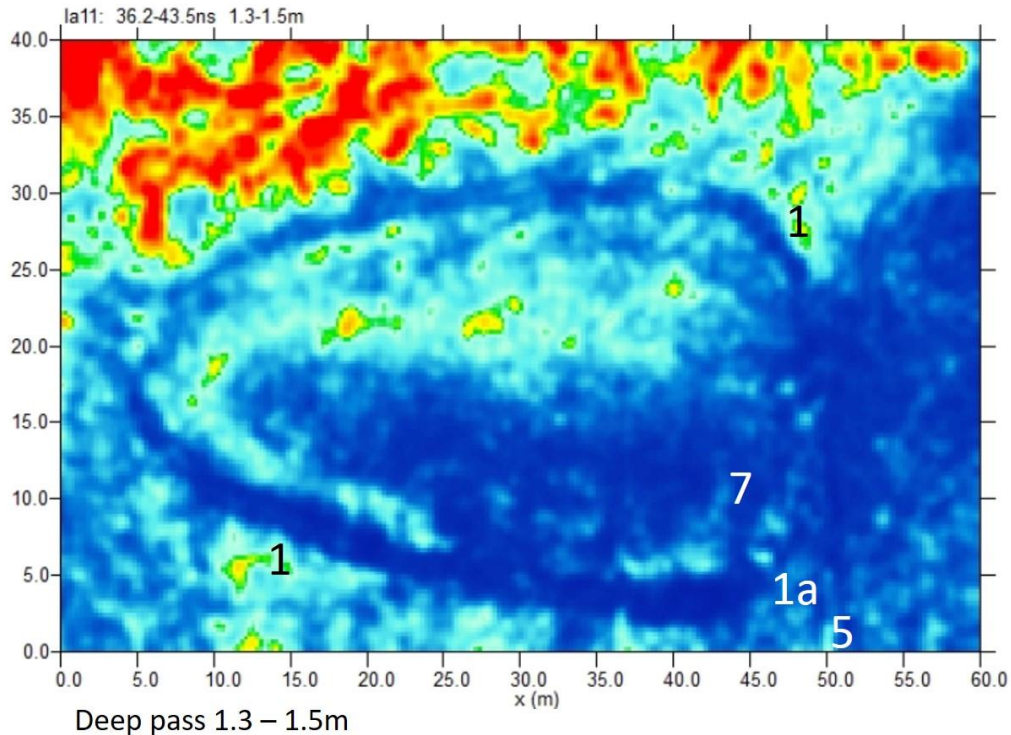


Fig 3e.

The long barrow ditch (1) is immediately obvious in shallow pass as a low amplitude feature at 0.2- 0.3m depth. It continues to register to a depth about 2m, consistent with Phillips' sections (1935, fig3). Uncertainty surrounds the presence of the ditch at the east end of the site. Field observation (above) by one of the authors (DF) recorded apparent flanking ditch terminals at north and south but no evidence of a linking ditch. Deep pass 0.8 – 1.0m (fig 3c) however leaves no doubt that anomaly 1 curves south as far as anomaly 5, interpreted as Phillips' secondary ditch (see below). The southern ditch registers as a wider anomaly between 35 and 45m east but in deep pass 1.3 – 1.5m (fig 3e) appears to register between 45 – 50m east as a slighter feature (1a), curving northwards to the intersection with 5. This accords with Phillips' findings (fig 1), the aerial photographic evidence (fig 4) and survey by RCHME (fig 5).

Uncertainty of both signal and differential grass growth at the SE 'corner' may relate to disturbance marked by RCHME. Phillips

possibly located his trench G – H there to resolve problems of interpretation. The long barrow ditch profile he recorded (section G) was characteristic of others around the circuit, though interestingly the overlying humus was deeper (0.6m) and exhibited no surface indication of the underlying ditch (fig 2). This probably relates to localised spread from the barrow. There is no reason therefore to conclude that a deeper ditch terminated at the SE 'corner'. It was confirmed as somewhat narrower on the axis of the barrow at the eastern end (Phillips section E – F) but the strength of the signal to the north of that point, and Phillips' G – H section to the south of it, suggest this is very localised. It is possible that a causeway originally lay here and was later closed by a narrower ditch.



Fig 4. NMR 27913_036 13-JAN-2014 (detail).

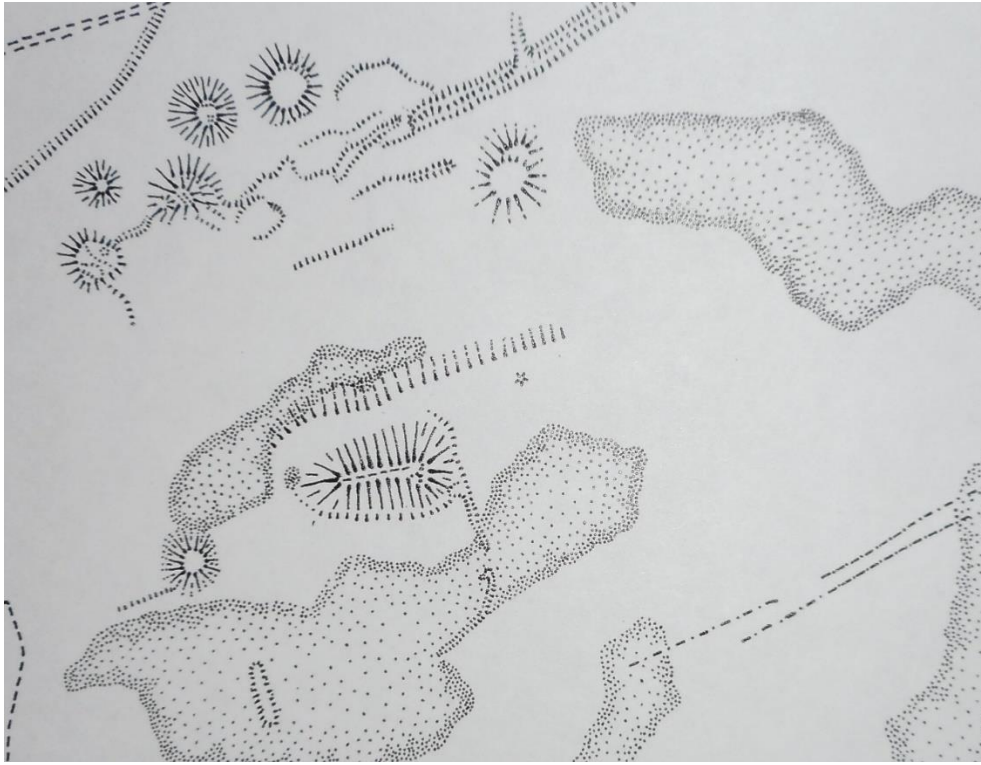


Fig 5. RCHME survey of Therfield Heath (detail)

It is clear then that the ditch encompasses the barrow. The overall plan is essentially heart-shaped: trapezoidal with sides minimally curved. The eastern end is only gently convex but the narrower, western end is emphatically rounded. This differs somewhat from Phillips' plan (1935, fig 1), based on ditch sections and field observation, that showed it as ovate. His ditch expansion at the north-west extremity failed to materialise in the surveys beyond slight traces in shallow pass at 0.2 – 0.3m. This may relate to shallow flint extraction (fig 5) or the passage of Phillips' secondary ditch (5) as it crosses the long barrow ditch.

Within deep pass 0.4 – 0.6 (fig.3b) a narrow feature (2) is revealed at 10m east and curving from 15 to 25m north. This lies *within* the western extremity of the enclosing long barrow ditch and appears to delimit the mound at that point. To the south its line appears to be

extended east by high amplitude readings (3) that then curve north *within* the eastern extremity of the long barrow ditch. It is possible these readings indicate revetment of the barrow, presumably by chalk blocks (cf. Giants' Hills II: Evans & Simpson 1991), although Phillips' sections found no trace of this. The lobate form of the southern line is reminiscent of ditch and mound plan at Ditchingham, Norfolk

An alternative explanation, given the shallow depth of these features, is that they represent close fencing of the barrow at some point in the not too distant past, chalk packing being employed along the southern and eastern sides. It is notable that the slight western ditch appears to merge with the long barrow ditch (1) along the northern side, and, as Phillips' plan shows, barrow edge and ditch are closer there.

The line of Phillips' main transverse section (1935, trench B) is also visible at this level (4) as a high amplitude anomaly but interestingly not the 19th century axial trench.

From 0.6m (shallow pass) and 0.8 – 1.0m (deep pass) (fig3 c – d) a slight trench (5) delineated by high amplitude readings can be seen running alongside the eastern end of the barrow and then curving broadly to run alongside, and possibly encroach upon, its northern flank. It last appears at a depth of about a metre. In all passes it can clearly be seen to cut the long barrow ditch. This is consistent with a later ditch that Phillips 'found to cross the barrow ditch at a high level and curve rapidly toward the barrow upon which it presumably rested' (1935, 105). He termed this the secondary ditch. As an earthwork he recorded its continuation southwards and, after interruption by a causeway, south-westwards. The line revealed by GPR survey adds a north side to what may now be taken to have

been an enclosure that incorporated the long barrow in its north-eastern corner. The slightness and unexpectedly high reading of the feature are consistent with Phillips' finding that the ditch had been packed with chalk to hold posts (1935, 105). Since only one putative post pipe was recorded in trenches about a metre wide, the assumption must be that these were spaced as elements of a post and rail fence rather than a continuous palisade. Phillips was unable to establish the date of the feature but the fact that it is clearly visible as an earthwork south of the long barrow, and can be seen to cut ridge and furrow of almost certain Napoleonic date, makes suggestion of a prehistoric date less credible. Emplacement for a stockade corral associated with commoning is a possibility.

A further slight, high magnitude anomaly (6) to the south of the barrow appears at depths of 0.4 – 0.6m in both deep and shallow passes. It runs east – west, curving slightly to avoid encroachment. A significant difference from the above feature is that it clearly respects the long barrow ditch, *not* the barrow. That could indicate contemporaneity but, given the lack of depth, an association with golf course management seems far more likely, the scheduled area being avoided rather than the ditch.

A rather amorphous low amplitude linear feature (7) appears between 0.8m and 1.0m gently curving from the north – east corner of the grid toward the eastern arc of the long barrow ditch (fig 3c). It may continue south, cutting the long barrow ditch at approx. 40m and 43m east, running obliquely across the berm (fig 3e). Its limited visibility raises questions about its integrity although it appears clear at 1.3 – 1.5m. It cannot be represented by G in Phillips' section G – H since ditch separation at that point was only in the order of 2m, not the 5m recorded by time slices 1.3 – 1.6m.

Mound interior results

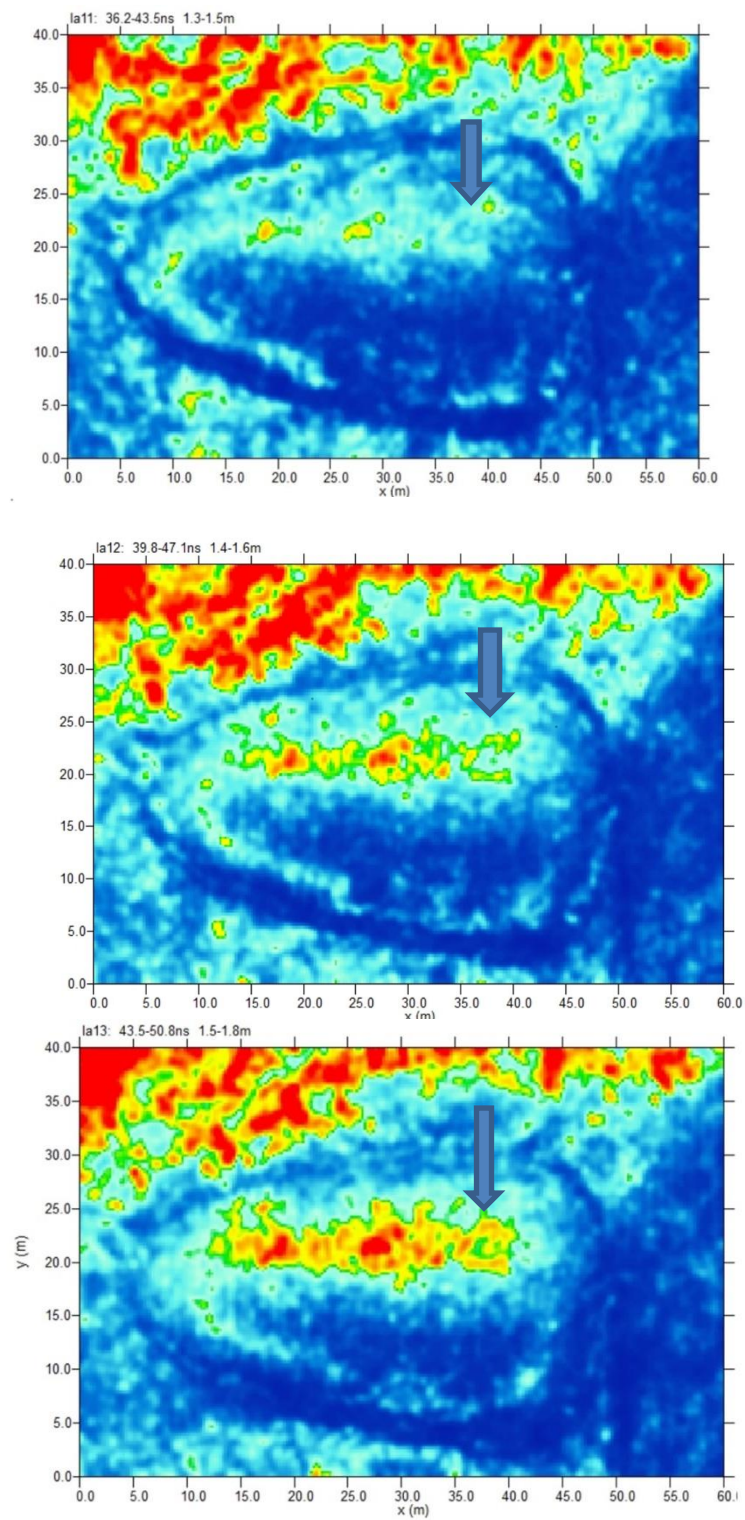


Fig 6 Deep passes: 1.3 – 1.5m/ 1.4-1.6m/1.5 – 1.8m

Phillips recorded the height of the barrow from his transverse sections as some 1.8m. Deep passes in the order of 1.5 – 1.8m should then furnish a picture of any structures on, or just above the buried old land surface. A tantalising feature (arrowed) at 1.3 -1.5m is an apparent pennanular ditch little more than 2 – 3m in diameter. At a slightly deeper level it appears to be underlain by a ring of high amplitude readings that at 1.5 – 1.8m resemble a ring cairn. The ‘feature’ lies approximately where Nunn recorded a bank of flints running north west to south east. It is possible this represents a small cairn but, if so, the sequence of features appears inverted; any ditched circle would lie at the base, not the summit of such a cairn.

It lies at the east end of a broad line of high amplitude anomalies running to the north of the spine of the barrow. This could be taken to be the filling of Nunn’s trench were it not for its non-axial location and extension to the ends of the mound; aerial photographs (fig 4) show Nunn’s trench to have been limited to the crest of the barrow. The possibility that it represents a chalk spine is precluded by Phillips’ demonstration the barrow core was entirely composed of turf. However, once the correction referred to above is applied to Phillips’ sections (reversing his A – B labels) it becomes obvious that beneath the mound there is a distinct rise in the level of the chalk bedrock (c 2 feet; 0.60m) extending south some 25 feet (7.6m) from the centre of the northern ditch. That correlates convincingly with the southern margin of the anomaly at that point in deep passes 1.3 – 1.5m and 1.4 – 1.5m. The fact that it first appears clearly at 1.4 -1.6m and merges with an expanded, and thereafter consistently sized, anomaly at 2.0 – 2.2m is consistent with Phillips’ recorded height of the chalk rise as c. 0.6m. The expanded feature seems likely then to represent progressive readings of the bedrock beneath the barrow as the elevated area was passed.

Results - resistivity survey

Problems with the equipment meant that the resistivity survey could not be completed. Focus was directed at the southern and eastern end of the site. No significant features were revealed.

Conclusions

Geophysical survey has confirmed Phillips' fieldwork conclusion that the Therfield Heath long barrow shares the Midland and East Anglian pattern of an enclosing ditch of relatively slight dimensions. Ditch readings in the region of 2m maximum width x 2m maximum depth are consistent with his excavated sections (1935, fig3). His reconstruction of the overall ditch plan as ovate has, however, been shown to be erroneous. The heartshaped plan revealed by GPR survey cannot be closely paralleled by other sites in the region (fig 7). The flattened east end and more clearly rounded western end are echoed at the considerably more elongated, plough-raised site at Eynesbury, Cambs (Ellis 2004, fig 12) but the overall plan of that site is oblong rather than trapeziform. Amongst 67 long enclosure sites in Lincolnshire surveyed by Jones (1998) only an unexcavated example at Thorganby (co. no. 57) appears a reasonably close morphological and dimensional parallel, and within the national survey carried out in the 1980s (Loveday 1985) only three sites closely correspond: Levington, Suffolk (co.no. 134), Purley A, Berkshire (co.no. 138) and Latton, Wiltshire (co.no. 136) (fig 6). The latter has subsequently been excavated and demonstrated to have had its ditch backfilled by c1900 – 1720 cal BC. (Powell *et al* 2009), a surprisingly late date for a comparatively slight feature. This might suggest that the form

delineates a late type of barrow. While too great an emphasis should not be placed on precise convergences of ditch morphology, there seems no doubt that the Therfield Heath ditch plan was laid out with both care and deliberation.

Internally the slight inner ditch (B) visible at the western end of the site conceivably echoes inner ditches at Giants' Hills I and II and West Rudham but its apparent continuation as a high amplitude anomaly along the southern interior rather suggest it is directly related to barrow edging. Anomaly 5 confirms Phillips' belief that a secondary ditch that he encountered at the east end of the barrow turned into the mound along its northern side.

An enigmatic feature at the eastern end of what is taken to be a raised area of chalk bedrock just within the northern ditch circuit, may represent a small circular structure conceivably associated with Nunn's bank of flints.

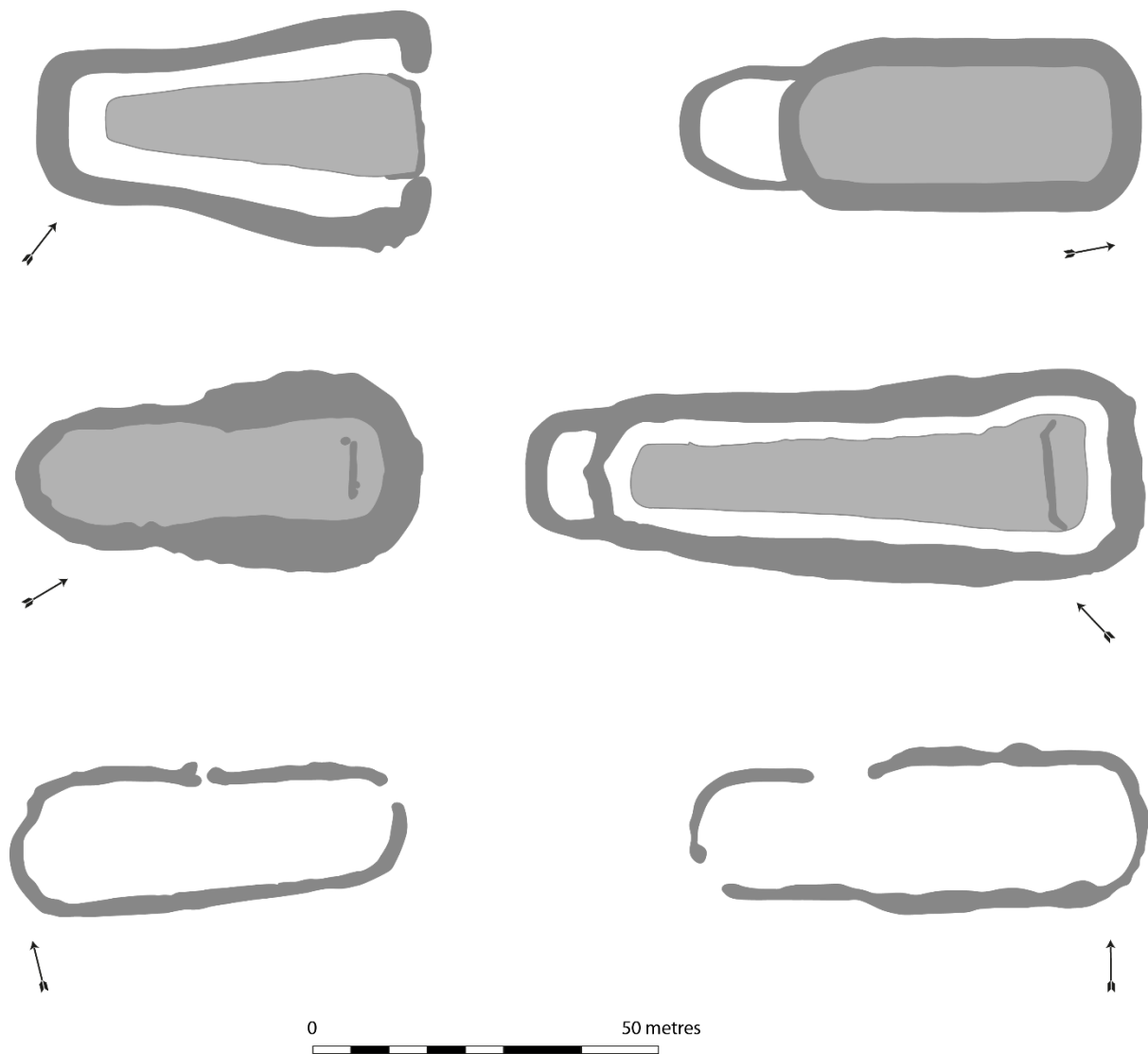


Fig 5 Comparative regional plans: top Haddenham; West Rudham

Middle: Eynesbury; Giants' Hills II

Bottom: Broome; Roughton

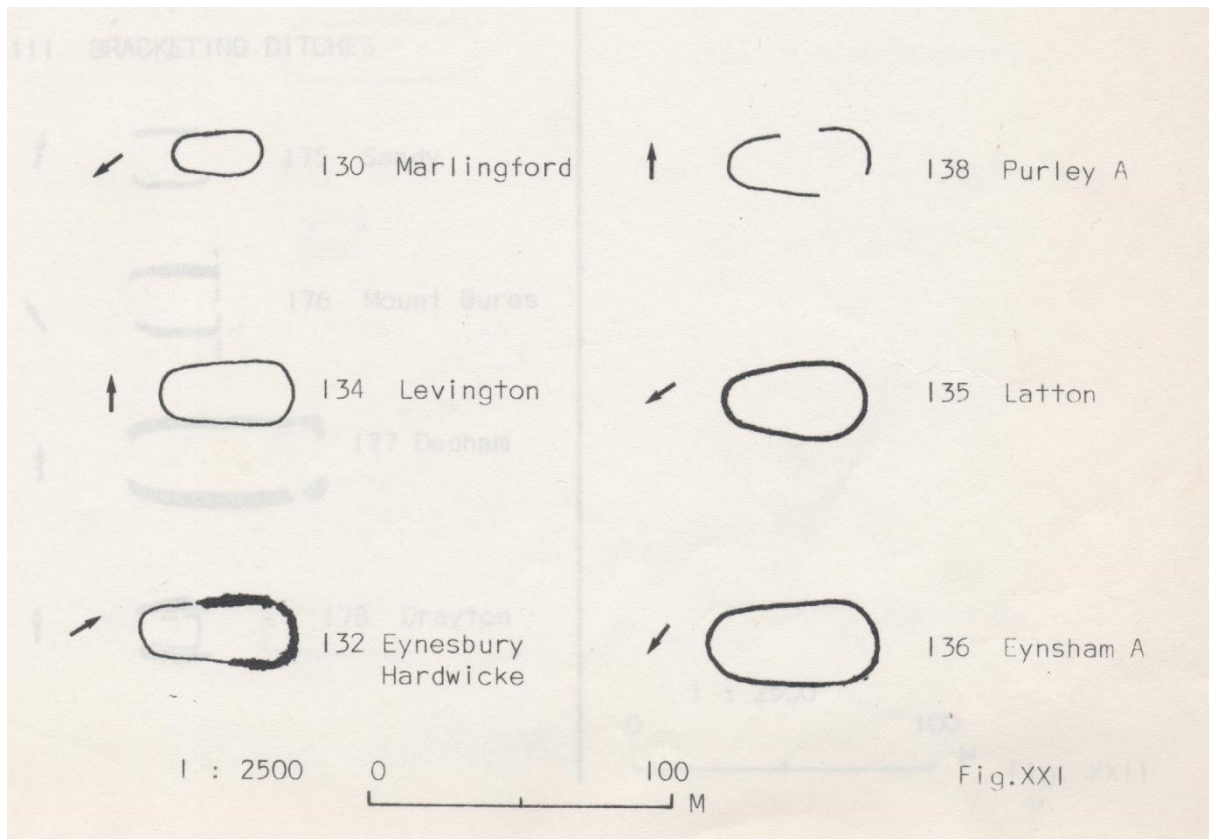


Fig 6 Comparative plans (Loveday 1985)

Bibliography

Beldam, J 1861 Proc Soc Ants (2nd series) 1

Crawford, O G S 1936 Field archaeology of the Royston District
Proceedings Prehistoric Society 2.

Ellis, C.J. 2004 *A Prehistoric Ritual Complex at Eynesbury, Cambridgeshire. Excavation of a Multi-Period Site in the Great Ouse Valley, 2000 -2001*. East Anglian Archaeology Report 17.

Evans, C. & Hodder, I. *A Woodland Archaeology. Neolithic sites at Haddenham. The Haddenham project Volume 1*. McDonald Institute Monograph.

Evans, J.G. & Simpson, D.D.A. 1991 Giants' hills 2 long barrow, Skendleby, Lincolnshire, *Archaeologia* 109, 1 – 46.

Jones, D. 1998 Long barrows and Neolithic Elongated Enclosures in Lincolnshire: An analysis of aerial photographic evidence.
Proceedings of the Prehistoric Society 64, 83 – 114.

Loveday, R. 1985 Cursus and related monuments of the British Neolithic

https://archaeologydataservice.ac.uk>view>cursus_phd_2006>meta_data.

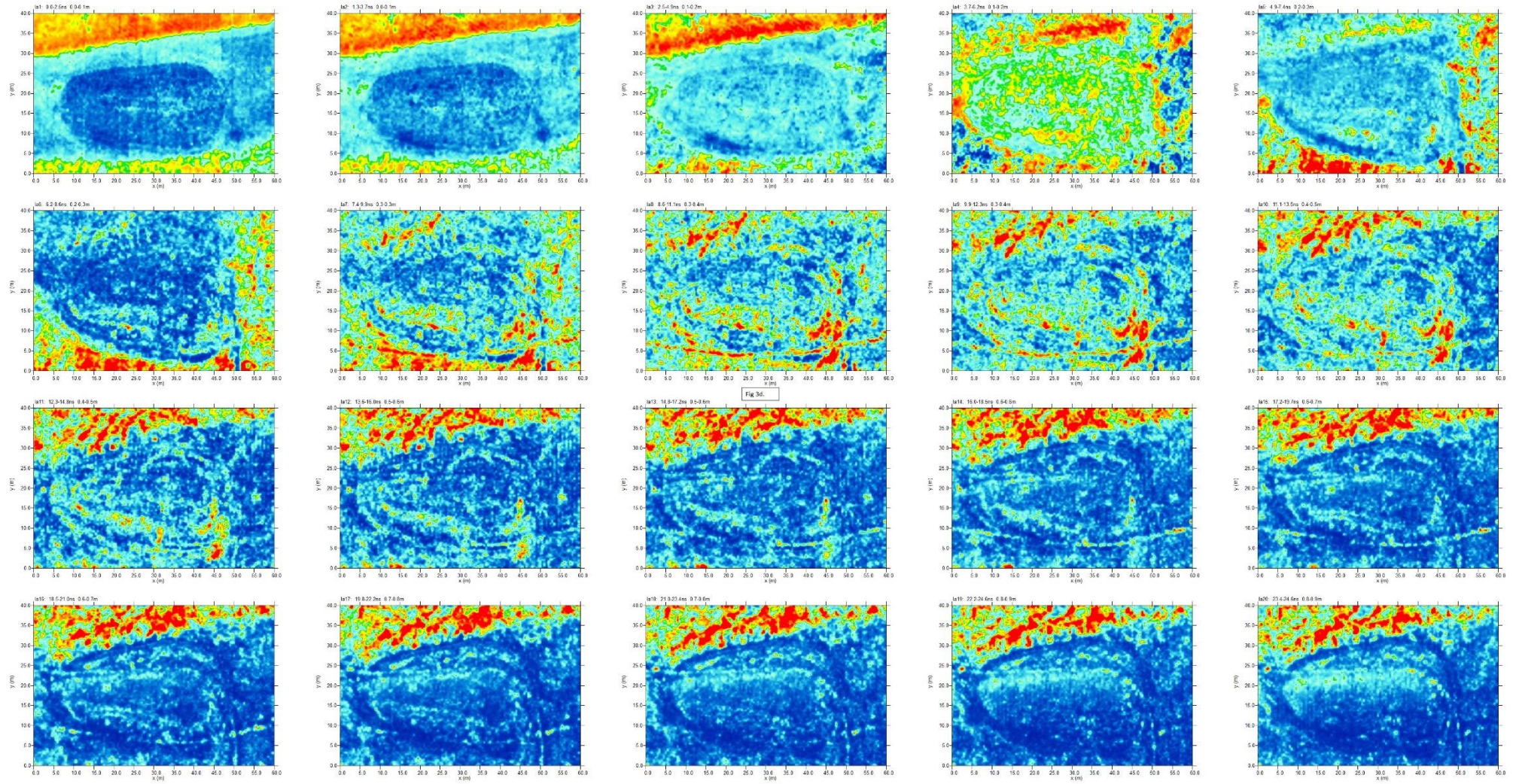
Loveday, R., Harris, O., Carey, G. & Ashby, D. 2018 Characterising survivors, explaining absence: a survey of preserved East Anglian long barrows, *Past* 88, 5 – 7.

Phillips, C. W. 1936 The excavation of the Giants Hills long barrow, Skendleby, Lincolnshire *Archaeologia* 85, 37-106

Phillips, C.W. 1935 A re-examination of the Therfield Heath long barrow, Royston, Hertfordshire, *Proceedings of the Prehistoric Society* 1, 101 – 7.

Powell, K. Laws, G. & Brown, L. 2009 A Late Neolithic/Early Bronze age enclosure and Iron Age and Romano-British settlement at latton Lands, Wiltshire, *Wiltshire Archaeological and Natural History Magazine* 102,

Appendix 1 Shallow passes



Appendix 2 Deep passes

