

## **Introduction**

Excavation of a medieval tile production site was undertaken near Finchingfield, Essex, in the context of planning policy framework (MHCLG 2021). Fieldwork and post-excavation assessment have been completed (Antrobus 2023), with analysis ongoing. Though prehistoric and post-medieval activity were evident at the site, this paper focuses exclusively on the medieval tile production phase - and given the stage of work, mainly on early-stage investigative methods employed, and their implications for further work as analysis progresses.

## ***Background***

The project's scope was defined in a WSI (Mortimer 2022), produced in line with fieldwork standards from ALGAO (Gurney 2003) and ClfA (2020), as well as MoRPHE (Historic England 2015), following an evaluation reporting medieval archaeology of unknown nature, clustered by a buried road (Foster 2022). The evaluation brief did not include geophysical survey, which would likely have flagged an anomaly over the kiln, given its position between shallow overburden and free-draining geology (Gaffney, Gater and Ovenden 2002, p.3); in its absence, no specific approach to such a site could be agreed in advance of the project. Nonetheless, data from trenching was sufficient to inform a general strategy based on open-area excavations, one of which was indeed well-placed to capture the focus and surrounding of production. Project aims included:

...[to] record the evidence of past occupation of the site and [...] ascertain the purpose and chronological sequence and parameters of that occupation [...] use the artefactual and ecofactual evidence to gain a better understanding of the medieval land use and economy of the area. (Mortimer 2022, p. 4).

Lacking prior knowledge, the aims obviously make no explicit mention of the tile production site. Nonetheless, investigating its currency and organisation is key to the stated aim of understanding land-use and economy, and the occupation's chronological sequence/parameters. Specific research aims were to be adopted as fieldwork progressed in reference to the then-current research framework (Medlycott 2011), though it was revised before assessment: relevant research areas identified included Med(Rural)04 ("How can we improve our understanding of medieval rural industries?") and Med(Urban)22 ("What can we do to improve our understanding of medieval craft and industry?")(RF 2022).

### ***Characterising occupation***

Excavation revealed a series of overlaid medieval enclosures in Area 1, along with the well-preserved substructure and rake-out pit of a large kiln constructed of tiles and fired clay. Surrounding discrete features included posthole structures, possible ovens, a mortar-mixing pit, a possible cess-pit, and possible well. No large dumps of waster tiles were recovered, but finds included quernstone fragments and a knife, possibly related to temper preparation and/or tile trimming (White, Paynter and Brown 2015, p.44-45). The assemblage from the kiln also produced few waster fragments, so there is little direct evidence of the kiln products. The greater potential for research at the site lies in understanding the spaces, technology, and social/economic context of tile production, rather than mapping producer-consumer relationships between sites, often prioritised at production sites (White, Paynter and Brown 2015, Table 1, p.20). Kiln sites with evidence of ancillary buildings/workshops are poorly represented in published examples (Drury 1981, p.132, 138; Hinton 2018, p486); assessment of this site notes the potentially important contribution of Finchingfield's 'industrial complex' and its setting (Antrobus 2023, p.83).

Archaeobotanical analysis was applied to material from stratified bulk samples, and has suggested that the species present are compatible with a wider, “open ‘waste’ landscape of some long grass, shade and scrub”, possibly pasture or common land (Antrobus 2023, p.64, summarising Aitken 2023). The site plan shows two overlaid programmes of land-use in the medieval period, where enclosures 1 and 2 were established, before rearrangement to enclosures 3 and 4 (ibid, fig.4). This presents a particular challenge for the project, in distinguishing where there is or is not contemporaneity between the kiln and other features, i.e. which evidence should be discussed in specific relation to the production complex or earlier/other land-use. Indeed, finds including nails for shoeing horses and oxen and a small assemblage of pig bone hint at animal husbandry, while waste deposits hint at domestic occupation within the enclosures (Clarke 2023). Distinguishing where activity was chronologically separate or merely peripheral to tile production is dependent on a robust phasing model for the evidence.

At assessment, spatial alignments and stratigraphic relationships were incorporated as component data into a basic phasing model to produce broad ‘earlier’ and ‘later’ phases in line with the enclosure rearrangement. A broad strategy of sampling stratified organic-rich deposits yielded opportunities for radiocarbon dating: a posthole, possible cess pit aligned with the kiln, and a possible well all produced cereal grains, which, being single, short-lived entities, would provide a date with minimal offset (Bayliss and Marshall 2022, 34-42). The results aligned these features within earlier and later phases, but also provided anchor points for interpreting related deposits: the result from the possible cess pit (SUERC-107043) suggested a 14<sup>th</sup> century date for itself and associatively for the kiln, given its proximity and close alignment. It was hoped that, for features lacking secure relative dating, the further component of artefactual dating would enhance the resolution of these phases. However,

the spatial and temporal proximity of activity on the site complicated deposition patterns, probably through waste-spreading and redeposition (Anderson 2023b, forthcoming): many deposits produced mixed early and high medieval pottery, indicating widespread residuality/intrusivity. Thus, the phasing model remained (borrowing statistical terminology) particularly sensitive to the component of spatial alignments, lacking stability (Bayliss and Marshall, 2022). In response, a more nuanced approach to interpreting pottery deposition was adopted in further work: this included statistical analysis to compare the minimum number of vessels present in earlier/later medieval fabrics within each feature. Features in the earlier phase (i.e. late 12-13<sup>th</sup> century) averaged 34.3% early wares, and the later phase (13-14<sup>th</sup> century) only 12.8% (Anderson, forthcoming); this approach produced data which converges well with existing parameters, and stabilises the model considerably.

### ***Kiln investigation***

Differentiated excavation methods were employed for the excavation of the kiln and its rake-out pit. A half-section through the associated stoke/rake out pit allowed the fill sequence of the feature to be recorded (Antrobus 2023, fig. 22, section OO), and therefore analysed for information on the use and lifetime of the kiln; the uncomplicated fill sequence suggests a limited period of operation (ibid, p.71). Bulk samples were taken from lower fills, for both potentially datable material (discussed below), and planned species analysis of charcoal for fuel identification (Aitken 2023, p.217).

The kiln itself was excavated in full, in line with Historic England guidance (White, Paynter and Brown 2015, p.8); but in contrast to the rake-out pit, this was approached in complete, reverse stratigraphic order, the full backfill removed before the tile built structure (Antrobus 2023, figs 19-20). This approach attempts to reverse depositional processes one stratigraphic

unit at a time (Harris 1989, p.113), and allows units to be “seen for what they are”, restoring what Carver calls “the humanity of the deposit” (2009, p.117). Practically, that also made it possible to reveal more of the sub-structure for observation and recording altogether, likely improving visibility of possible repairs, key to recording industrial structures (White, Paynter and Brown 2015, p.8, 37). The lack of observed repairs supports the suggested limited lifetime for the operational kiln; these observations have implications for not only the chronology of the site, but the economic level at which the kiln operated. Beyond the technical record, the cleared firing chamber produced a striking and legible feature for display, enhancing the opportunity for public engagement and understanding. Indeed, the exposed kiln arches were a key focus for communicating the story of the site to local stakeholders at the site’s open day event, and on social media (Fig. 1).

A drawback of this strategy is that it did not produce a section of the kiln backfill for interpretation: only one section (see Antrobus 2023, fig. 19) illustrates a partial view of the deposit. The backfill is described in excavator notes as a single debris deposit “packed tight throughout the kiln chamber”, possibly comprising the collapsed/demolished superstructure (Antrobus 2023, p.33). However, without a cleared section (or indeed, spit excavation), and limited visibility into the structure, it will have been difficult to distinguish stratigraphic horizons. As such, the record is low-resolution, and could have obscured sequential deposits inside the kiln, as observed elsewhere (Divers and Jarrett 2008; Historic England 2015, p.8) – and in turn, limits confidence in artefactual interpretation. Waster fragments attributed to the kiln backfill (Anderson 2023a, forthcoming) may have represented an *in situ* deposit of kiln furniture, distinct from the debris backfill. Tile samples were taken for analysis, though the strategy for selection is not documented: analysis would likely have benefited from more granular contextualisation, expanding the opportunity for analysis of

patterns/inconsistencies, and comparability with other assemblages (ibid, p.7-8; cf. Zeepvat 2009; cf. Drury and Pratt 1975).

Successive removals of the front wall and north-east arches allowed for one longitudinal and two transverse sections of the structure itself to be recorded (see Antrobus 2023, figs. 19-21). Notes from excavators on physical relationships (e.g. lining placed against the tile arches) were also incorporated into assessment of the structure (ibid, p.32). Though this strategy differed from the quadrant method suggested by HE (White, Paynter and Brown 2015, p.8), with the GPS survey it created an effective record of the physical structure in three dimensions, capturing the twin flues, narrower rear arches and clay floor/walls and stoke holes, and enabling typological identification. This makes close comparative analysis possible within a group from Essex, and 13-15<sup>th</sup> century building traditions in the south-east (Antrobus 2023, p.69; Drury 1981, p.131; Cherry 1991, p.194). A caveat to the success of the structural record is the unexcavated half of the rake-out pit; the remaining baulk may have obscured significant features such as stairs (cf. Drury *et al.* 1975, p.92) or postholes (cf. Mayes and Scott 1984, p.37). Confirmed presence/absence of such features could have further enhanced the site's contribution to *comparanda*.

### ***Kiln chronology***

All archaeological data is most valuable when placed in time, ideally integrating absolute and relative dates into a chronological model (Bayliss and Marshall, 2022). The model for dating the kiln was based on three overarching components: deductive generalisation from site stratigraphy and alignment (relating to the date of construction), typological dating of structural artefacts (date of construction and/or repair), and scientific dating (date of operation).

The complexity of using artefactual typologies for dating contexts is discussed above, and echoed in analysis of artefactual elements of the kiln structure. Despite the standing structure comprising tiles of 14-15<sup>th</sup> century types (Anderson 2023), dating its construction was unexpectedly complicated by signs of their possible re-use from an earlier structure; a further minority of tiles from the backfill (i.e. possibly from the original superstructure) resembled later, possibly post-medieval types (Anderson 2023a; Antrobus 2023, 69). Combined, these might suggest a 15-16<sup>th</sup> century date for the kiln (Anderson 2023a) - significantly destabilising a chronological model based on site stratigraphy/alignments and artefactual evidence from the rake-out, all of which suggest the kiln operated in the 14<sup>th</sup> century (Antrobus 2023, 69). The assessment has dealt with this instability by treating the possibly later tiles as 'misfits' for further analysis (ibid, p69; Anderson, forthcoming), i.e. possibly intrusive anomalies to be excluded from the chronological model (Bayliss and Marshall 2022, p.21). Unfortunately, the relatively low-resolution contextualisation of the tile sample and kiln fill sequence means questions of the tiles' deposition cannot confidently be reappraised.

Scientific dating was attempted to establish a use-date for the kiln from the lowest fill of the rake-out pit – as with the possible cess pit and well discussed above, bulk sampling produced a cereal grain for a radiocarbon dating. However, the method dates the end-of-life for the organism, and only usefully dates its context if the sample was recently dead at deposition (ibid, p.3; White, Paynter and Brown 2015, p. 14). The results (SUERC-107040, 1163-1261calAD at 95.4% probability), could not be reconciled with the 14<sup>th</sup> century *terminus post quem* established by the tiles of the kiln structure, and must indicate residuality. Despite the precision of scientific data, its usefulness still relies, like all archaeological data, on the character and legibility of the unit's relationship to the group.

Material with a stronger, functional relationship to kiln-use, e.g. charcoal from the pit (probably wood felled specifically for fuel), might have mitigated this risk of residuality - but depending on the age of the wood/tree-rings used, it too risks significantly off-set results if no sapwood or short-lived material is available (Bayliss and Marshall, p.30, 36). With further analysis of charcoal from this context planned, this may yet be pursued.

Methods such as directional archaeomagnetic or luminescence dating, both of which could have been applied to *in situ* structural tiles and/or clay lining, avoid material residuality issues by instead measuring an event: the last time the sample was heated above 400°C for archaeomagnetometry (University of Bradford 2024) or 250°C for luminescence (Aitken 1997, p.184), i.e. the last firing of the kiln. This would effectively provide an abandonment date for the kiln, and a *terminus ante quem* for its operation; beyond inferences that the kiln's operation was relatively short-lived (discussed above), this element of the chronological sequence has not been approached. The structure appeared suited to either, on free-draining ground with no slumping to compromise magnetic alignment (University of Bradford 2024), with a good depth of fired clay/ceramic over 0.3m below surface for luminescence (Aitken 1997; Duller 2008). However, when successful, the precision archaeomagnetometry offers for the medieval period (using RenCurve calibration) is around 100-150 years (Lanos 2004; University of Bradford 2024). Depending on the overlap with parameters indicated by existing data, and given the apparent time-proximity of medieval phases, it's possible even a successful result would not have improved chronological resolution. Luminescence dating can offer closer precision, at 5-10% of the sample age – i.e. a margin of 35-70 years for a sample from 1300AD (Aitken 1997; Duller 2008), or better since the kiln must have operated later. Neither method was applied on-site, and since the material is no longer *in situ*, archaeomagnetic dating is now impossible; however, there may

yet be scope for thermoluminescence dating on sampled material from the kiln, if an appropriate soil sample is available for background measurements (Aitken 1997; Duller 2008).

### ***Conclusions***

Within the scope of this paper's focus on the tile production site at Finchingfield, it is clear that at this point, investigative methods have ascertained the purpose of occupation, and despite complex evidence, have produced a fairly cohesive account of its chronology, in line with these initial aims of the project design. This has been achieved through the combination of data from multiple methods: stratigraphic and spatial assessment, typological dating of artefacts and a carefully adjusted statistical approach to pottery analysis, structural typology, and scientific dating – all of which relied upon, and were limited by, the differentiated excavation and sampling strategies implemented on site. The scope of ongoing analysis will be defined by benefits and consequences of contrasting excavation strategies in the rake-out pit and kiln, favouring section-recording or on-site legibility: the limiting effects of low-resolution sequencing within the kiln, for instance, are weighed against the benefits of structural visibility for both recorders and visiting members of the public. The project also demonstrates the benefits of scientific dating as a precise anchor for site sequencing, as well as a warning that the usefulness of any archaeological datum, scientific or not, is always limited by the demonstrability of its relationship to context. More than anything, this site demonstrates the importance of multi-disciplinary approaches, to build a robust chronological model based on enough converging components to withstand anomalous or complicating results.

Word Count: 2590

**Bibliography** \*Sources provided in supporting documents

\*Aitken, E. (2023) "Plant macrofossil, charcoal and terrestrial molluscs" in Antrobus, A. *Land at Bardfield Rd, Finchingfield, Essex: Post-Excavation Assessment and Updated Project Design*  
Unpublished CA Report

Aitken, M. J. (1997) "Luminescence Dating" in Taylor, R. and Aitken, M. (eds.) *Chronometric Dating in Archaeology. Advances in Archaeological and Museum Science* Vol 2. Plenum Press: New York.

\*Anderson, S. (2023a) "Ceramic Building Material" in Antrobus, A. 2023 *Land at Bardfield Rd, Finchingfield, Essex: Post-Excavation Assessment and Updated Project Design*  
Unpublished CA Report

\*Anderson, S. (2023b) "Pottery" in Antrobus, A. 2023 *Land at Bardfield Rd, Finchingfield, Essex: Post-Excavation Assessment and Updated Project Design* Unpublished CA Report

Anderson, S. (forthcoming) *Bardfield Road, Finchingfield (FFBR21): Ceramic Building Material Archive Report*

Anderson, S. (forthcoming) *Bardfield Road, Finchingfield (FFBR21): Pottery Archive Report*

Antrobus, A. (2023) *Land at Bardfield Rd, Finchingfield, Essex: Post-Excavation Assessment and Updated Project Design* Unpublished CA Report

Bayliss, A. and Marshall, P. (2022) *Radiocarbon Dating and Chronological Modelling: Guidelines and Best Practice*. Historic England, London.

Carver, M. (2009) *Archaeological Investigation* Abingdon: Routledge.

Cherry, J. (1991) "Pottery and Tile" in Blair, J. and Ramsay, N. (eds.) *English Medieval Industries*. Hambledon Press: London.

Cotswold Archaeology (May 2022) [Twitter/X]. Available at:  
<https://twitter.com/CotswoldArch> (Accessed January 2024)

Drury, P. J. (1981) 'The production of brick and tile in medieval England', in Crossley, D. (ed.) *Medieval Industry*. Council of British Archaeology Research Report 4 p.126-142

Drury, P. J., Pratt, G. D., Biek, L., Bradford, G., Dan, J., Dunning, G. C., Evans, J., Temple, O., and Young, B. R. (1975) "A late 13th and early 14th century tile factory at Danbury, Essex" *Medieval Archaeology* 19, p.92-164

Duller, G. (2008) *Luminescence Dating* English Heritage: Swindon. Available at:  
[http://dx.doi.org/10.1007/978-94-007-6326-5\\_125-1](http://dx.doi.org/10.1007/978-94-007-6326-5_125-1)

Foster, S. (2022) Bardfield Road, Finchingfield, Essex - Archaeological Evaluation. CA Evaluation Report.

Gaffney, C., Gater, J. and Ovenden, S. (2002) The Use of Geophysical Techniques in Archaeological Evaluations. Paper No. 6. Institute of Field Archaeologists: Reading.

Harris, E. C. (1989). *Principles of Archaeological Stratigraphy*. London and San Diego: Academic Press.

Historic England (2015), *Management of Research Projects in the Historic Environment*. Available at: <https://historicengland.org.uk/images-books/publications/morphe-project-managers-guide/heag024-morphe-managers-guide/> (Accessed 14 January 2024)

Gurney, D. (2003) *Standards for Field Archaeology in the East of England* East Anglian

Archaeology Occasional Paper 14

Lanos, P. (2004) "Bayesian Inference of Calibration Curves: Application to Archaeomagnetism" in Buck and Millard (eds.), 2004 *Tools for constructing chronologies*. Springer: London. P.43-82.

Mayes, P. and Scott, K. (1984) *Pottery Kilns at Chilvers Coton, Nuneaton*. Society for Medieval Archaeology: London.

Medlycott, M. (ed.) (2011) *Research and Archaeology Revisited: A Revised Framework for the East of England* East Anglian Archaeology Occasional Paper **24**

MHCLG = Ministry of Housing, Communities and Local Government 2021, *National Planning Policy Framework*. Available at:

<https://webarchive.nationalarchives.gov.uk/ukgwa/20230830172251/https://www.gov.uk/government/publications/national-planning-policy-framework--2> (Accessed: 27 Dec 2023)

\*Mortimer, R. (2022) *Bardfield Road, Finchingfield, Essex: Written Scheme of Investigation for an Archaeological Excavation*. Unpublished document.

Research Frameworks (2022) *East of England Regional Research Framework* Available at: <https://researchframeworks.org/eoe/> (Accessed 15 Dec 2023)

University of Bradford (2024) *Archaeomagnetic dating* Available at:

<https://www.bradford.ac.uk/archaeomagnetism/archaeomagnetic-dating/> (Accessed: 1 January 2024).

Zeepvat, R. (2009) "Rose Cottage, Tylers Green: excavation of a 15th to 17th century tiling" *Records of Buckinghamshire* 49, p.189–218





*Figure 1 Social media posts of kiln (CA 2022)*