
Archaeology & Built Heritage

Archaeological Area Excavation
on the Site of a Former Brick Works
Between Breach Lane & Station Road
Earl Shilton, Leicestershire, LE9 7GT

NGR: SP 4633 9680

Undertaken on behalf of
Primrose Consulting Ltd.

By

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Contents

	Page
Summary	2
1.0 Introduction	3
2.0 Location, Topography and Geology	4
3.0 Background and Context to the Excavation	4
4.0 Research Aims and Objectives	5
5.0 Methodology	6
6.0 Results	7
7.0 Finds	11
8.0 Discussion	12
9.0 Project Archive	19
10.0 Publication	19
11.0 Bibliography	19

Figures (pages 21-29)

Figure 1. General Location Plan

Figure 2. Site Location Plan

Figure 3. Archaeological Interpretation of Geophysical Survey Results

Figure 4. Archaeological Excavation Area Defined in Brief, outlined in red (Clark 2020).

Figure 5. Location of Excavation Areas (in blue) in relation to Application Site (in red)

Figure 6. Detail of OS 1:10560 map XXXVI.SW, surveyed 1886 and published 1887

Figure 7. Detail of OS 1:2500 map XXXVI.13, revised 1901 and published 1903

Figure 8. Detail of OS 1:2500 map XXXVI.13, revised 1914 and published 1916

Figure 9. Excavation Plan showing principal features (Areas A and B)

Figure 10. Plan showing remains of brick kiln and adjacent structure in Area A

Figure 11. Plan showing remains of building in Area B

Figure 12. Excavated sections.

Figure 13. Detail of brick works as shown on OS 1:2500 map XXXVI.13, published 1903

Figure 14. Scotch Kiln at Bottesford, Leicestershire in 1910

Figure 15. Surviving Scotch Kiln on the Calke Abbey estate at Ticknall, Derbyshire

Photographs 1-31 (pages 30-45)

Summary

Archaeology & Built Heritage conducted an archaeological area excavation on the site of a former brick works located between Breach Lane and Station Road, Earl Shilton, Leicestershire, at the request of Primrose Consulting Ltd.

The archaeological excavation was required in respect of an application to develop the site for residential use and examined that part of the brick works complex located within the application site.

The fieldwork was undertaken in two stages, in May (Area A) and October (Area B) 2021.

The excavation uncovered part of a Scotch kiln, the complete plan of a second structure that probably served as a moulding shed, part of a trackway that gave access to the brick works from Station Road, other associated surfaces, and drainage features.

Documentary sources indicate that the brick works was established around 1888 by John Edward Cotton and operated into the early years of the 20th century.

The brick works is first illustrated on an Ordnance Survey map surveyed in 1901 and published in 1903. This shows a complex of buildings likely to include circular and rectangular kilns, a moulding shed and a drying shed, in addition to a well and clay pit. A trackway giving access to the site from Station Road is also shown. On the subsequent Ordnance Survey map edition, revised in 1914 and published in 1916, the brick works is marked as disused and only the circular kiln (not within the application site) and part of the moulding shed were still standing by then.

No earlier archaeological remains were identified and all of the excavated features were associated with the brick works.

The excavation results provide a detailed record of the surviving remains, addressing the research aims and objectives of the project.

The project archive will be deposited with Leicestershire Museums Service under the Accession Code: X.A85.2021.

1.0 Introduction

- 1.1 This report presents the results of an archaeological area excavation conducted by Archaeology & Built Heritage (A&BH) on the site of a former brick works, between Breach Land and Station Road, Earl Shilton, Leicestershire.
- 1.2 The archaeological investigation was commissioned by Primrose Consulting Ltd, in advance of residential development of the site.
- 1.3 The archaeological excavation was required as a condition of planning permission for the development, granted by Hinckley & Bosworth Borough Council (HBBC), the Local Planning Authority (Planning Application ref: 21/00607/FUL).
- 1.4 The requirement for the implementation of a programme of archaeological investigation and recording as a condition of planning permission for development is in accordance with local planning policies and the *National Planning Policy Framework* (NPPF), Section 16: Conserving and enhancing the historic environment (MHCLG 2019, 54-7). Paragraph 199 of the NPPF states that:

Local planning authorities should require developers to record and advance understanding of the significance of any heritage assets to be lost (wholly or in part) in a manner proportionate to their importance and the impact, and to make this evidence (and any archive generated) publicly accessible. However, the ability to record evidence of our past should not be a factor in deciding whether such loss should be permitted.
- 1.5 The specific requirements of the programme of archaeological investigation and recording work were set out in advice and a Brief issued by the Principal Planning Archaeologist at Leicestershire County Council, in the capacity of archaeological advisor to Hinckley & Bosworth Borough Council (Clark 2020).
- 1.6 A Written Scheme of Investigation (WSI) was prepared in response to this advice and Brief by A&BH, for the approval of the Local Planning Authority (Finn 2020).
- 1.7 The archaeological fieldwork was undertaken in two stages, that examined contiguous areas (Areas A and B on Figure 5). The Brief initially required the archaeological excavation of an area measuring c. 25m x 10m, to investigate the northern part of a brick kiln and associated remains located within the application site. This area, designated as Area A, was excavated in May 2021.
- 1.8 In addition to the remains of the brick kiln and an adjoining structure, a further structure was partially exposed against the northern edge of Area A. Following a monitoring visit, the County Planning Archaeologist indicated the need to fully expose, investigate and record this structure. Consequently, Area B, to the north of Area A, was stripped and investigated in October 2021.

2.0 Location, Topography and Geology

- 2.1 Earl Shilton is a small town in the borough of Hinckley & Bosworth, in south-west Leicestershire, located c. 3 miles (5 km) north-east of Hinckley and 9 miles (15 km) south-west of Leicester (Figure 1).
- 2.2 The application site is a pasture field approximately 7781 m² in area located on the southern fringe of the town, between Breach Lane to the east and the rear boundaries of properties along Station Road to the west, at National Grid Reference SP 4636 9683 (Figure 2). Access to the site is from Breach Lane.
- 2.3 The excavation area was located against the southern boundary of the application site, at National Grid Reference SP 4633 9680. Areas A and B combined were c. 285m² in extent (Figure 5).
- 2.4 The application site occupies ground that falls gradually to the south-east. Ground level in the north-west corner of the site is at c. 103.5m above Ordnance Datum and ground level in the south-east of the site is at c. 99.90m above OD. Within the excavation area, several self-set trees and shrubs occupy locally quite uneven ground.
- 2.5 The solid geology of the area is Mudstone of the Edwalton Member, a sedimentary bedrock formed approximately 228 to 237 million years ago in the Triassic Period, when the local environment was dominated by hot desert conditions. The bedrock is overlain by superficial deposits of Clay and Silt of the Bosworth Clay Member. These are sedimentary deposits of glacial origin, formed up to 2 million years ago in the Quaternary Period during ice age conditions (British Geological Survey Geology of Britain online viewer, accessed 17/08/2020).
- 2.6 The geological natural ground exposed within the excavation area was a yellow brown pebbly clay (Bosworth Clay Member).

3.0 Background and Context to the Archaeological Excavation

- 3.1 The second edition Ordnance Survey 1:2500 scale map sheet XXXVI.13, revised in 1901 and published in 1903, shows a brick works on this site (in field no. 234a), consisting of rectangular and circular kilns, associated structures likely to include moulding and drying sheds, a well and a clay extraction pit. A trackway giving access to the brick works from Station Road to the west, crosses the adjacent field, numbered 234 (Figure 7).
- 3.2 The brick works complex is not shown on the earlier Ordnance Survey 1:10560 scale map sheet XXXVI.SW, surveyed in 1886 and published in 1887 (Figure 6).
- 3.3 The next edition of the 1:2500 scale map sheet XXXVI.13 was revised in 1914 and published in 1916. On this map the brick works is marked as disused and the only

buildings shown are the circular kiln and a small rectangular structure on the edge of the clay pit. A pond is shown within the northern part of the clay pit (Figure 8).

- 3.4 The map evidence indicates that the brick works was established between 1886 and 1901 and went out of use between 1901 and 1914 (its chronology is discussed in more detail in a later section of the report).
- 3.5 In the 1900 edition of *Kelly's Directory of Leicestershire & Rutland*, John Edward Cotton is listed as a farmer and brick maker, with the address of the brick works given as Station Road (Table 1). No other brick makers are listed in Earl Shilton at the time and the brick works shown on the Ordnance Survey 1:2500 map edition published in 1903 can be confidently identified as that of John Edward Cotton.
- 3.6 Only the northern part of Cotton's brick works lay within the current application site, the rest of the complex occupying a neighbouring plot of land to the south.
- 3.7 A geophysical survey of the application site was undertaken by Archaeological Services Durham University in February 2017 (Figure 3). This showed the extent of the infilled clay extraction pit (including the former pond illustrated on the Ordnance Survey map edition published in 1916), which at 3365 m² occupied just under half the area of the application site. Possible structural remains associated with the former brick works and the access trackway were also identified, in the south-west part of the site (Villis 2017).
- 3.8 Based on the results of the geophysical survey, an excavation area measuring c. 25m x 10m, located against the southern site boundary, west of the infilled clay pit, was defined by the Principal Planning Archaeologist (Clark 2020). This was intended to investigate the geophysical anomalies thought to represent structural remains associated with the brick works and a portion of the access trackway (Figure 4).

4.0 Research Aims and Objectives

- 4.1 Regional research aims are defined in *East Midlands Heritage: An Updated Research Agenda and Strategy for the Historic Environment of the East Midlands* (Knight, Vyner and Allen 2012), which builds on an earlier resource assessment and research agenda: *The Archaeology of the East Midlands: An Archaeological Assessment and Research Agenda* (Cooper 2006).
- 4.2 The archaeological excavation of the former brick works site was identified as having the potential to contribute towards themes defined in section 6.9 of *East Midlands Heritage*, which provides a research agenda for the Modern period (1750 - present), specifically paragraph 9.7.4: *How can we develop further our understanding of brick-making and the manufacture of pottery, tiles and clay pipes?* (Knight, Vyner and Allen 2012, 122).

- 4.3 The specific objectives of the archaeological excavation, as set out in the WSI, were:
- To investigate and record any buried archaeological remains located within the excavation area, including structural and other remains associated with the brick works known to have occupied this site in the late 19th and early 20th centuries;
 - To establish the character, extent and date range of any buried archaeological remains that are encountered;
 - To interpret any such remains within the context of the known current and previous land use of the development site and the wider area;
 - To produce a report and archive of the findings of the project.

5.0 Methodology

- 5.1 The archaeological excavation was undertaken in accordance with the general methodology set out in section 7 of the approved WSI (Finn 2020, 6-9).
- 5.2 Area A was investigated first (between 13/05/2021 and 21/05/2021), followed by Area B some months later (on 06/10/2021).
- 5.3 Both areas were stripped using a JCB wheeled excavator fitted with a flat-bladed ditching bucket under archaeological control and supervision (Photos 1-4).
- 5.4 Disturbed ground along the eastern edge of both areas was associated with the infilling of the clay pit in the second half of the 20th century.
- 5.5 Areas of localised ground disturbance within Area A resulted from the removal of tree stumps as part of the stripping process.
- 5.6 A site grid was established at 5m intervals across Area A and subsequently extended to cover Area B also.
- 5.7 All archaeological remains exposed were investigated and recorded, including the preparation of written, drawn and photographic records. Context numbers were assigned on site in a single consecutive sequence and these are cited in the report in square brackets [01-46].
- 5.8 The metric system was employed on site for dimensional recording. Since the kiln and other structures were built when the imperial system was in use, measurements in feet and inches are also given where this is considered appropriate.

6.0 Results

- 6.1 The archaeological excavation uncovered: the northern end of a brick kiln, the rest of which lay beyond the southern boundary of the application site; the complete plan of a second structure (in Area B); other structural features; a trackway that gave access to the brick works from Station Road; external brick surfaces; and drainage features. The archaeological remains are described below and illustrated in Figures 9-12.

Brick Kiln (Figures 9-10)

- 6.2 The superstructure of the excavated kiln was dismantled soon after the brick works went out of use, evidenced by its absence on the Ordnance Survey map edition published in 1916. Only the brick-built base of the kiln remained, terraced into the natural slope of the site (Photos 5-6). The base of the kiln was c. 0.7m below the level of the external surface [46] on its north side. The remains of the kiln were overlain by a thick deposit of orange sand containing broken brick fragments [18], representing debris from the dismantling of the superstructure.
- 6.3 The kiln measured c. 5.43m (17 ft 10 in) wide externally (E-W), with the internal firing chamber being c. 3.43m (11 ft 3 in) wide. The approximate length of the kiln, taken from Ordnance Survey mapping, was c. 9.92m (32 ft 6 in), though only about a third of this was within the excavation area.
- 6.4 The base of the firing chamber consisted of a level brick surface [04], the orange-red coloured bricks measuring 229 x 111 x 76 mm (9 x 4 $\frac{3}{8}$ x 3 in). On the east and west sides of this were the remains of the long walls, with integral fireholes, constructed in the same brick (Photos 7-8). The west wall [17] had been largely robbed away, though more of the east wall [09] remained *in situ*; both walls were around 1m (3 ft 3 in) wide at the base (Photo 9). Two fireholes were exposed on each side of the kiln, spaced at 1.32m (4 ft 4 in) centres [21-24]. All four were similar (though survival varied), consisting of a rectangular brick-lined recess c. 0.96m (38 in) long x 0.35m (14 in) wide, with a brick floor set 0.34m (13 $\frac{1}{2}$ in) below the level of the base of the firing chamber (Photo 10). A layer of fine grey wood ash [25] was present in the base of each firehole, to a maximum depth of c. 50mm.
- 6.5 Between the opposed fireholes the brick surface of the firing chamber was heat affected, consisting of two clearly defined linear bands of purplish coloured scorching c. 230mm (9 in) wide [27] (Photo 11). Immediately adjacent to the fireholes more intense heat had distorted and vitrified the brickwork (Photo 12). These linear scorch marks indicate the location of fire channels that distributed heat within the kiln.
- 6.6 The north wall of the kiln had been entirely robbed away; its position was marked by a c. 0.7m wide band of natural clay, between the brick base of the firing chamber and the terrace cut within which the kiln was built [19] (Photo 13). Unlike the natural ground beneath the firing chamber, the clay beneath the north wall line was not heat affected.

- 6.7 A rectangular block of mortared brickwork [20], measuring 0.62m x 0.42m and surviving to a height of 2 courses (0.15m), was the remains of a buttress, built against the north wall of the kiln, close to the NE corner (Photo 13). This was constructed from the level of the external surface [46], using the same brick as the rest of the kiln. The base of the buttress was pitched to the south and it was either built this way (as a battered buttress) or had subsided after the kiln superstructure was dismantled. If there had been an equivalent buttress at the NW corner of the kiln, as seems likely, no trace of it remained. A surviving 19th century brick kiln at Baumber, Lincolnshire has battered buttresses in the same position (NLHE ref: 1359923).
- 6.8 Surfaces composed of broken brick – typically half bricks – on the west [10] and east [26] sides of the kiln were 0.34m lower than the base of the firing chamber, level with the bottom of the fireholes. These surfaces provided working areas for fuelling the kiln.
- 6.9 The working area on the west side was c. 2.3m wide (E-W) and enclosed within a structure built against the external face of the west wall of the kiln, as shown on the Ordnance Survey map edition published in 1903 (Photo 14; Figure 7). Parts of the north and west walls of this structure survived, built against the terrace cut [19]. These walls were composed of un-mortared bricks laid in herringbone fashion [03] (Photo 15). The west wall was 0.23m wide and the north wall twice this, consisting of a double skin of bricks. The maximum height of the surviving remnant, at the NW corner of the structure, was 0.85m above floor level. The walls were built using several different types of brick, most of which were clearly reused in this context, including a number of half-round and saddleback coping bricks (Photo 16).
- 6.10 No equivalent structure was identified on the east side of the kiln and [26] was presumably an external surface. A block of roughly-built brickwork [12], 6 courses high, adjacent to the external face of the east wall of the kiln, at its NE corner, served to retain the terrace cut [19] at this point (Photo 17).
- 6.11 Immediately to the north of the kiln and the adjoining structure on its west side was an E-W aligned drain (Photo 13). The drain trench [08] was 0.26m wide and contained a 5-inch o.d. cylindrical salt-glazed ceramic pipe. The backfill of the pipe trench [16] included numerous broken circular-section land drain fragments, a few of which were stamped 'DRAIN'. It seems that the drain had originally been formed using land drain pipes, which were subsequently grubbed out and replaced with the salt glazed pipe; the broken land drain fragments were thrown back into the trench as it was backfilled. The fall of the drain was from west to east and a cut feature [02], adjacent to the NW corner of the structure on the west side of the kiln, probably housed a ceramic gully that emptied into the drain (Photo 18). It is likely that the structure on the west side of the kiln had a lean-to roof with a gutter along its west side that channelled rainwater into the gully via a downpipe. A similar lean-to is shown against the side of a brick kiln at Bottesford, Leicestershire, that was photographed in use in 1910 (Figure 14).

Area B Building (Figures 9 & 11)

- 6.12 The building exposed within Area B was constructed in two phases (Photos 4 & 19-20).

Phase 1

The first phase consisted of the remains of a rectangular structure measuring c. 7.8m x 3.9m (25 ft 7 in x 12 ft 10 in), with its long axis aligned approximately ENE-WSW (taken hereafter as E-W).

- 6.13 The north [28-29] and south [30] wall foundations were 0.24m wide and consisted of mortared brickwork surviving up to 2 courses (0.15m) high. At the corners (except the truncated SE corner) were more substantial blocks of brickwork [31-33] measuring up to 0.76m x 0.4m wide (2 ft 6 in x 1 ft 4 in). There was no west wall foundation and the building was either open at this end or had a wide (double) doorway. The east wall foundation was part of the second phase structure (described below).
- 6.14 The interior was paved in brick [34] that had been partially robbed away. This paving extended beyond the west end of the building forming an external surface [11] measuring 3.05m x 0.76m (10 ft x 2 ft 6 in); it was this surface that had initially been partially exposed against the northern edge of Area A (Photos 19 & 21). There were traces of an internal feature set into the brick floor in the central southern part of the building. The remains of a decayed timber plank [35] lay parallel with and 0.5m in from the inner face of the south wall foundation. Adjacent to this was a 2½ inch o.d. cast iron pipe [36], set just below floor level. A second section of the same pipe [37] ran through a gap in the north wall foundation where it was joined into a larger diameter iron pipe [38] (Photo 22). This arrangement of pipes appears to have fed water to a tank or cistern within the building. The water source may have been the pond within the northern part of the clay pit, shown on the Ordnance Survey map edition published in 1916, with the supply being gravity fed (Figure 8).
- 6.15 The wall foundations and floor of the first phase structure consisted of bricks measuring 241 x 118 x 76 mm (9½ x 4⅝ x 3 in), except for a section of the north wall foundation [29] that was composed of reused blue bricks with one concave face, measuring 310 x 118 x 73 mm (12 x 4⅝ x 2⅞ in), presumably originally used for surface water drainage; these were laid on edge and bonded with mortar to form a foundation that was similar in width and height to the rest of the north wall foundation (Photo 23).
- 6.16 A salt-glazed ceramic drainage gully with iron grid [39] was set into the external brick surface [11], close to the SW corner of the building; this presumably collected rainwater runoff from the roof via guttering and a downpipe (Photo 24).

Phase 2

- 6.17 The second phase involved the construction of a small addition against the east end of the Phase 1 building. This addition measured c. 2.5m E-W x 1.75m N-S (8 ft 2 in x 5 ft 9 in) and had brick-built wall foundations 0.23m (9 in) wide (Photos 20 & 25). The south

[41] and west [42] wall foundations were built on wider brick footings, 0.46m (18 in) wide and 2 courses high (0.15m). The east wall foundation [43] had been partially robbed, with a single, incomplete course of bricks laid on edge marking the line of this wall. An internal brick floor [44] had also been partly robbed out.

- 6.18 All of the bricks used in the wall foundations and floor of the Phase 2 structure measured 229 x 111 x 76 mm (9 x 4 $\frac{3}{8}$ x 3 in). This included the foundation on the line of the east wall of the Phase 1 structure [42], suggesting that the original building had an open east end or wide doorway, matching the arrangement at the west end.
- 6.19 The bricks used to construct the Phase 2 addition were identical to those used to build the excavated kiln.
- 6.20 The Phase 2 structure corresponds with the northern part of the rectangular building shown on the Ordnance Survey map edition published in 1916 (Figure 8); the southern part of this left no trace in the ground.

Trackway

- 6.21 A trackway giving access to the brick works from Station Road is shown on the 1903 Ordnance Survey map, crossing field no. 234 on a ESE-WNW alignment (Figure 7). That part of the trackway within the application site was located by the geophysical survey undertaken in 2017 (Figure 3; Willis 2017, 5).
- 6.22 Part of the trackway was exposed in Area A, aligned E-W on the north side of the excavated brick kiln. It consisted of a compact layer of black clinker with inclusions of broken brick and pebbles [46], typically 3.3m (10 ft 10 in) wide and 0.15m (6 in) deep (Photos 1-3 & 26). The surface widened to the east, between the excavated brick kiln and the Area B building. The surface appeared to have been formed by stripping turf and topsoil along the length of the trackway and infilling the resulting cut with clinker that was then compacted.
- 6.23 The clinker used to surface the trackway was not fuel waste from the excavated brick kiln, which was wood fired. Directories record that J.E. Cotton was a Director of the Earl Shilton Gas Light & Coke Company Ltd in the 1890s (Table 1). The gas works was situated on the west side of Station Road to the north of the brick works and this may have been the source of the clinker.
- 6.24 Continuing the line of the trackway, to the east, was a surface composed of broken bricks and granite [07]. This turned and sloped down to the south, with granite fragments concentrated along the curved north-eastern edge of the surface, resembling a wide kerb (Photos 27-28). A linear arrangement of large granite fragments and some brick [05], apparently formed a kerb or low retaining wall along the southern edge of surface [07], between this and the lower-lying ground to the south (Photo 29). Towards the SE corner of the excavation area, surface [07] had been truncated or

robbed away. Some of the brick fragments incorporated into this surface were overfired kiln wasters.

- 6.25 A concentration of irregular granite fragments and broken brick [06], within the area of surface [07], formed no obvious structural arrangement (Photo 29). Excavation revealed considerable modern root disturbance at this point, hampering interpretation of this feature.
- 6.26 Cutting through surface [07] on a NE-SW alignment was a pipe trench [13]. The cut was 0.35m wide and contained a 6-inch o.d. iron pipe [12], the top of which was 0.18m below the surface (Photo 30). This may have been a water supply pipe, similar to [38].
- 6.27 A surface composed of half bricks [01], c. 1m (3 ft 3 in) wide, lay to the south of the trackway [46], on the west side of the structure that adjoined the excavated kiln. The surface was at the same level as the trackway and apparently formed a path that extended beyond the southern limit of excavation (Photo 31).

7.0 Finds

- 7.1 Other than structural components (e.g. bricks and drains) no finds certainly associated with the operation of the brick works were encountered.
- 7.2 Bricks were recorded on site and a selection were retained for reference purposes. None of the bricks bore makers' stamps; a few were frogged. Several distorted and overfired bricks were noted in the overburden within Area A, incorporated into wall foundation [03] and surface [07], that were presumably wasters from kiln firings, however none of these provided consistent measurements to indicate the size of the bricks produced by the kiln.
- 7.3 Many of the bricks used to build the walls of the structure on the west side of the excavated kiln [03] were clearly reused in this context; some had traces of mortar adhering to them. A variety of different bricks were employed, including two different types of coping bricks.
- 7.4 None of the land drain pipes in the backfill [16] of drain [08] were sufficiently complete to warrant retention. Those examples marked 'DRAIN' were probably manufactured in the period 1826-1850. In 1784 a tax was imposed on bricks and other clayware building materials, including land drains. In 1826 land drains were exempted from the tax provided that they had the word 'DRAIN' impressed into them before firing. The tax was abolished in 1850 and there was no requirement to stamp land drains after that date (Museum of Rural Life n.d.; Brunskill 1997, 192-3).
- 7.5 A length of 50mm (2 inch) wide flat iron bar was found in the demolition deposit [18], overlying floor surface [10] within the structure adjoining the west side of the excavated kiln. This may have been a structural element, perhaps a lintel used over an

opening, or a strap to resist expansion of the kiln structure during firing, though strapping of this type is more commonly seen on circular (beehive) kilns.

- 7.6 No other finds were recovered.

8.0 Discussion

- 8.1 The excavated remains are associated with a brick works operated on this site by John Edward Cotton during the late 19th and early 20th centuries.

Documentary Evidence

- 8.2 John Edward Cotton is listed in directory entries for Earl Shilton over a 40-year period between 1876 and 1916 (Table 1). Before 1888 he is identified as a boot and shoe maker and a farmer. In the 1888 edition of *Kelly's Directory*, his occupation is given as 'Boot & shoe mfr and brick maker'. He is listed as a brick maker in subsequent directories until 1900, after which he is listed only as a farmer, resident at 101 High Street, Earl Shilton. The address of his brick works is given as Station Road in the 1900 edition of *Kelly's Directory*.
- 8.3 J.E. Cotton is listed as a Director of the Earl Shilton Gas Light & Coke Company Ltd in directories between 1887-8 and 1898 and John Cotton is listed as a Steward of the Wesleyan Methodist Chapel at Earl Shilton in the same period.
- 8.4 Other members of the Cotton family are listed in directory entries for Earl Shilton from 1849 onwards, typically engaged in boot and shoe manufacturing (Table 1). William Henry Cotton was a director of the firm Hurst, Cotton and Hopcroft, which later became W.H. Cotton & Sons Ltd, who manufactured boots and shoes at a factory on Hurst Road (off Station Road) that was established in 1898 and employed 207 workers in 1920 (HBBC 2000). The factory was demolished in the early years of the 21st century and Cotton Mews now occupies the site.
- 8.5 Additional documentary research (beyond the scope of the present commission), including a search of material held by the Record Office for Leicestershire, Leicester and Rutland (ROLLR), may shed further light on the business and private life of John Edward Cotton, possibly including his brick making concern.
- 8.6 Brick manufacturing was undertaken in the area prior to Cotton's involvement with the industry and the earliest reference to brick making in Earl Shilton occurs in a directory of 1835. The *Leicester Journal* of 2 April 1880 includes a seven-hole brick kiln at Earl Shilton in the list of items for sale (Rawlins n.d.). A kiln (presumably a brick kiln) is shown on the Ordnance Survey 1:10560 scale map sheet XXXVI.SW, surveyed in 1886 and published in 1887, on the west side of Station Road, approximately 300m to the north of the present site (circled in blue on Figure 6).

Table 1. Entries for Cotton listed at Earl Shilton in Leicestershire Directories 1846-1941.

Year	Directory	Page	Name	Occupation/Status
1846	White	567-8	No entries in name of Cotton	
1848	Post Office	2528	No entries in name of Cotton	
1849	Hagar	261-2	William Cotton	Shoe maker
1850	Slater	15	William Cotton	Boot & shoe maker
1854	Melville	181	William Cotton	Butcher & shoe maker
1855	Post Office	33-4	William Cotton	Shoe maker
1863	White	681-2	William Cotton	Farmer & shoe maker
1876	Kelly	354	John Edward Cotton William Cotton	Shoe maker Farmer
1877	White	206	John Edward Cotton	Boot manufacturer & farmer
1880	Wright	339-40	John Edward Cotton William Cotton	Boot & shoe mfr & farmer Farmer & grocer
1881	Kelly	515-6	John Edward Cotton William Cotton	Wholesale boot & shoe mfr Farmer & shop keeper
1884	Wright	343-4	John Edward Cotton William Cotton	Boot & shoe mfr & farmer Farmer & grocer
1887-8	Wright	394-5	John Edward Cotton* William Cotton	Bootmaker & farmer Farmer & grocer
1888	Bennett	44	J.E. Cotton W. Cotton	Boot maker Grocer
1888	Kelly	516-7	John Edward Cotton William Cotton	Boot & shoe mfr and brick maker Farmer & shop keeper
1891	Kelly	564	Jn Edwd Cotton William Cotton	Boot manuf. & brick ma. Farmer & shop keeper
1892	Wright	437-8	John Edward Cotton* William Cotton	Boot maker & farmer Farmer
1895	Kelly	66	Jn. Edwd. Cotton	Fmr. & brick ma.
1895-6	Wright	541-2	John Edward Cotton*	Listed under Farmers & graziers
1898	Wright	543-4	John Edward Cotton*	Listed under Farmers & graziers
1899	Bennett	10	J.E. Cotton*	Farmer, High St.
1900	Kelly	70	John Edward Cotton William Cotton	Farmer, 101 High Street & brick maker, Station Road Boot manufacturer, see Hurst, Cotton & Hopcroft, 25 Station Rd
1901-2	Bennett	12	J.E. Cotton	Farmer, High Street
1904	Kelly	71-3	John Edward Cotton William Henry Cotton	Farmer, 101 High Street Private resident, Ivydene Boot manufacturer, see Hurst, Cotton & Hopcroft, 25 Station Rd
1908	Kelly	74-6	John Edward Cotton William Henry Cotton	Farmer, 101 High Street Private resident, Ivydene Boot manufacturer, see Hurst, Cotton & Hopcroft, 25 Station Rd
1912	Kelly	74-6	John Edward Cotton William Henry Cotton	Farmer, 101 High Street Private resident, Ivydene, High St Boot manufacturer, see Hurst, Cotton & Hopcroft, 25 Station Rd
1916	Kelly	73-5	John Edward Cotton William Henry Cotton	Farmer, 101 High Street Private resident, Ivydene, High St Boot manufacturer, see Hurst, Cotton & Hopcroft, 25 Station Rd
1922	Kelly	74-6	William Henry Cotton	Private resident, Ivydene, High St

			No John Edward Cotton	Boot manufacturer, see Hurst, Cotton & Hopcroft, 25 Station Rd
1925	Kelly	80-2	William Henry Cotton	Private resident, Ivydene, High St Boot manufacturer, see Hurst, Cotton & Hopcroft, 25 Station Rd
1928	Kelly	78-80	William Henry Cotton	Private resident, Ivydene, High St Boot manufacturer, see Hurst, Cotton & Hopcroft, 25 Station Rd
1932	Kelly	79-81	William Henry Cotton Eric John Lee Cotton	Private resident, Ivydene, High St Boot manufacturer, see Hurst, Cotton & Hopcroft, 25 Station Rd Private resident, Beechome, High Street
1936	Kelly	78-80	William Henry Cotton Eric John Lee Cotton	Private resident, Ivydene, High St Boot manufacturer, see Hurst, Cotton & Hopcroft, 25 Station Rd Private resident, Beechome, High Street
1941	Kelly	76-8	William Henry Cotton Eric John Lee Cotton	Private resident, Ivydene, High St Shoe mfrs, see W.H. Cotton & Sons Ltd, International Works, Hurst Road Private resident, Beechome, High Street
End				

*= J.E. Cotton listed as a Director of the Earl Shilton Gas Light & Coke Company Ltd and John Cotton as a Steward of Wesleyan Methodist Chapel.

Chronology of the Brick Works

- 8.7 Based on the documentary and cartographic evidence, it appears that John Edward Cotton established the brick works on this site around 1888 and it was presumably still in operation in 1901 when it was mapped by the Ordnance Survey. The brick works seems to have gone out of use soon afterwards, however, and Cotton is not listed as a brick maker in directories after 1900. The suggestion that brick making ceased very soon after 1900 is supported by the fact that the disused clay pit shown on the Ordnance Survey map edition surveyed in 1914 (Figure 8) is no larger than it was when first surveyed in 1901 (Figure 7).
- 8.8 All of the structures recorded during the archaeological excavation had been demolished prior to 1914, except for the small addition against the east end of the Phase 1 building in Area B, which is shown as an unroofed structure on the Ordnance Survey map edition revised in 1914 and published in 1916 (Figure 8). The only other structure still standing at that date was the circular brick kiln (located to the south of the excavation site).

Layout of the Brick Works

- 8.9 In the 18th and 19th centuries brick manufacturing was typically a small-scale business that operated on a seasonal basis, with many brick makers also having some other means of income (as was the case with John Edward Cotton at Earl Shilton, who was also engaged in boot and shoe making and farming). Small brick yards met local demand and most villages with access to suitable clay deposits had a brick works nearby. John Rawlins' survey of *Brickmaking Sites in Leicestershire* demonstrates that many villages in the county had a brick works in this period (Rawlins n.d.).
- 8.10 Brick yards were established in close proximity to the clay deposits they exploited and, when these deposits were exhausted, kilns and other structures might be dismantled, moved and re-erected on a new site.
- 8.11 A range of factors, including developments in kiln technology and increased mechanisation of production processes, led to the closure of almost all of these small local brick yards by the middle of the 20th century, with national demand being met thereafter by a smaller number of large brick works (Stratton and Trinder 2000, 132-3). Most of the small local brick yard sites have subsequently been cleared or redeveloped and very few now survive.
- 8.12 The layout of a traditional brick works, including the size, shape and distribution of buildings and other associated elements, tends to reflected the various stages involved in the manufacture of bricks (e.g. Crossley 1994, 287-8). For this reason, it is worth examining the layout of the brick works site at Earl Shilton, as shown on the Ordnance Survey map edition published in 1903, before discussing the results of the archaeological excavation (Figure 13).
- 8.13 The various stages in the brick making process are usefully illustrated at a near-contemporary brick yard at Bottesford, Leicestershire, in a series of photographs taken in 1910, which can be viewed via the Bottesford Living History website: http://bottesfordhistory.org.uk/content/catalogue_item/bottesford-local-history-archive/photographs-of-bottesford-brickworks-during-the-edwardian-period.
- 8.14 The main stages involved in the manufacture of bricks may be summarised as: clay winning and preparation, moulding, drying and firing (Hammond 1981).

Clay winning and preparation

- 8.15 Clay was dug from the pit, which at Earl Shilton lay to the NE of the kilns and other buildings, with its outline shown hachured on the 1903 map (A on Figure 13). The amount of preparation needed depended on the particular qualities of the clay deposit, but typically the clay was dug and stockpiled within the pit in the autumn and left to

weather over the winter months. The following spring the clay was turned over, tempered with water and kneaded to make it suitable for moulding into bricks.

Moulding

- 8.16 The prepared clay was pressed into wooden moulds by hand to form the bricks; the process is described and illustrated in detail by Hammond (1981, 11-15). This stage could be undertaken in the open, on a moveable moulding bench, or under cover within a suitable shed. At Earl Shilton, a shed located adjacent to the west side of the clay pit may be tentatively identified as a moulding shed (B on Figure 13), a suggestion that is reinforced by the results of the archaeological excavation (see below).

Drying

- 8.17 The 'green' bricks needed to dry before they could be fired, to reduce their water content. The bricks were laid out, either in the open or in drying sheds or hacks. Typically, these were long, narrow open-sided structures designed to allow maximum airflow to promote the drying process, which usually took between 3 and 6 weeks. At Earl Shilton the long N-S aligned structure to the east of the kilns may be identified as a drying shed with reasonable confidence (C on Figure 13). No trace of this building was found during the excavation.

Firing

- 8.18 Once dry the bricks were transferred to the kiln for firing. At Earl Shilton there appear to have been two kilns, one rectangular (D on Figure 13) and the other a circular (beehive) kiln (E on Figure 13). A small structure of unknown function is shown between the two kilns.
- 8.19 A ready supply of water was needed for the initial preparation of the clay and at the moulding stage. At Earl Shilton a well is shown in the southern part of the brick works site on the 1903 map. A pond is shown against the northern edge of the clay pit on the Ordnance Survey map edition revised in 1914 and published in 1916 (Figure 8). Although not explicitly shown on the 1903 map edition, the outline of the northern edge of the pit on this map closely matches that of the pond shown on the later edition, suggesting that the pond was in existence when the brick works was in operation.
- 8.20 Access was another important factor in the operation of a brick works, since fuel had to be delivered to the site and the bricks taken away for sale and use after firing. At Earl Shilton the access trackway from Station Road, shown on the 1903 map, allowed materials to be transported to and from the site, presumably by horse and cart. The results of the archaeological investigation demonstrate that the trackway extended along the northern side of the excavated kiln, before turning to the south, providing access to the various buildings.

The Excavated Kiln

- 8.21 Despite the fact that the superstructure had been dismantled and only part of the kiln lay within the excavation area, it is possible to identify the kiln type.
- 8.22 Brick kilns are classified by the direction of the draught and the method of firing. They may be updraught, downdraught or horizontal-draught and firing may be either intermittent or continuous. An intermittent kiln had to be filled, heated, cooled and emptied each time it was fired. The excavated structure is an intermittent updraught kiln of a type known as a Scotch Kiln (Hammond 1977, 171).
- 8.23 Scotch kilns were a 17th century development of the clamp kiln and consisted of an open-topped chamber with entrances, called wickets, in one or both end walls, for loading and unloading the bricks, and a series of fireholes in the long walls, where fires were set to heat the kiln; the fires burned within the thickness of the side walls. Fire channels were formed within the firing chamber, between the opposed fireholes, to distribute heat evenly throughout the kiln. Once the green bricks had been stacked within the kiln, the wickets were temporarily blocked using previously fired bricks, that were dry stacked, often in a herringbone fashion (as seen at Bottesford in Figure 14). The top of the kiln was covered, again using previously fired bricks, the gaps between which could be adjusted during firing to control the draught. The firing process took several days with fuel being fed into the fireholes as needed. In coal-fired Scotch kilns, each firehole had an iron grate on which the coal burned, but wood fired versions did not require grates and the fuel burned on the base of the firehole. The kiln was then left to cool, after which the wickets were opened up and the fired bricks removed.
- 8.24 Relatively little kiln waste was present on the site, but all of the wasters were bricks. No evidence was seen to suggest that the kiln was used to fire other products, such as ceramic pipes or field drains. At Bottesford, a stack of pipes adjacent to the kiln (on the right of the frame in Figure 14) suggests that drainage pipes were manufactured there.
- 8.25 Scotch kilns were common in the midlands in the 18th and 19th centuries though most, if not all, appear to have gone out of use before the middle of the 20th century and very few now survive as upstanding structures (McWhirr and Smith 1994, 90).
- 8.26 A Scotch kiln of 18th or 19th century date survives to the rear of 24 Clements Gate, Diseworth; it was surveyed in 2018 prior to and during restoration (Hannon-Bland 2018). An example at Ashwell Road, Oakham, Rutland, was recorded prior to demolition in 1987 (McWhirr and Smith 1994, 87-93). There is a well-preserved late 19th century Scotch kiln off Main Street, Ticknall, on the Calke Abbey estate, just over the county boundary in Derbyshire, that was surveyed in 2009 (Watson 2009; Figure 15). The dimensions of these kilns are tabulated below for comparison with the Earl Shilton structure.

Table 2. Recorded dimensions of brick kilns discussed in the text.

Kiln location	Length (ext/int)	Width (ext/int)	Height	Side wall thickness	No. of fireholes per side
Diseworth	6.2m / 4.5m	4.9m / 3.2m	4m	0.9m	4
Ticknall	9m (ext)	5.8m (ext)	3.7m	1.0m	7
Oakham	9m / 7.1m	5.0m / 2.9m	c. 3.65m-4.57m	1.05m	7
Earl Shilton	c. 9.92m (ext)	5.43m / 3.43m	unknown	1.0m	unknown

- 8.27 The Ticknall and Oakham kilns are similar in length, though the Ticknall structure is wider. The Earl Shilton kiln is slightly longer than the Oakham and Ticknall examples, but otherwise similar. The Diseworth kiln is significantly smaller than the other local examples.
- 8.28 Hammond gives typical internal dimensions for Scotch kilns as: 20-50 ft long, 11-12 ft wide and 11-13 ft high (6.1m-15.24m long x 3.35m-3.65m wide x 3.35m-3.96m high) (Hammond 1977, 171).
- 8.29 The capacity of the kiln at Ashwell Road, Oakham was estimated at 25-30,000 bricks per firing (McWhirr and Smith 1994, 90). Given that the Earl Shilton kiln was both longer and wider than the Oakham example, it presumably also had a correspondingly larger capacity.
- 8.30 In addition to the Scotch kiln, there was a circular kiln at Earl Shilton, presumably a beehive kiln (located outside the application site). That this was still standing after the Scotch kiln had been dismantled, may indicate that the circular kiln remained in use longer, though the map evidence indicates that it was disused by 1914.

The Area B Structure

- 8.31 The absence of demolition debris in the vicinity of the Area B structure suggests that this was not brick-built. It is more likely that the brick foundations revealed by excavation supported a timber superstructure. This may have been clad and roofed either in timber or corrugated iron sheeting. The first phase building was almost exactly twice as long as it was wide, suggesting a 2-bay timber framework, probably with 12 ft (3.66m) square bays.
- 8.32 As noted in the description, a piped water supply appears to have fed a tank or cistern housed within this building. A ready supply of water was required for the brick moulding process and the building probably served as a moulding shed.
- 8.33 The specific function of the small (Phase 2) addition at the east end of the original building is not known. The foundations of the Phase 2 structure were built using bricks that were identical to those used to construct the excavated kiln. This part of the building remained standing after the first phase structure was dismantled.

- 8.34 The map evidence demonstrates that the Scotch kiln, drying shed and main part of the moulding shed were dismantled soon after the brick works went out of use, sometime between 1901 and 1914. These may have been taken down for re-use elsewhere, or for the sale of their constituent materials.
- 8.35 No earlier archaeological remains were identified and all of the excavated features were associated with the brick works.
- 8.36 The excavation results provide a detailed record of the surviving remains of the brick works located within the application site, addressing the research aims and objectives of the project.

9.0 Project Archive

- 9.1 The project archive consists of:
- 5 x annotated permagraph drawing sheets
 - 1 x A4 paper context index sheet
 - 46 x A4 paper context record sheets
 - 50 x colour digital photographs (in high resolution .jpeg format)
 - Photographic index
 - An unbound copy of this report
- 9.2 The project archive will be deposited with Leicestershire Museums Service under the accession code: X.A85.2021.

10.0 Publication

- 10.1 A summary of the findings of the project will be submitted to the editor of the *Transactions of the Leicestershire Archaeological and Historical Society* for inclusion in their annual roundup of archaeological work in Leicestershire and Rutland.
- 10.2 The full report will be made available via the Archaeology Data Service's OASIS website.

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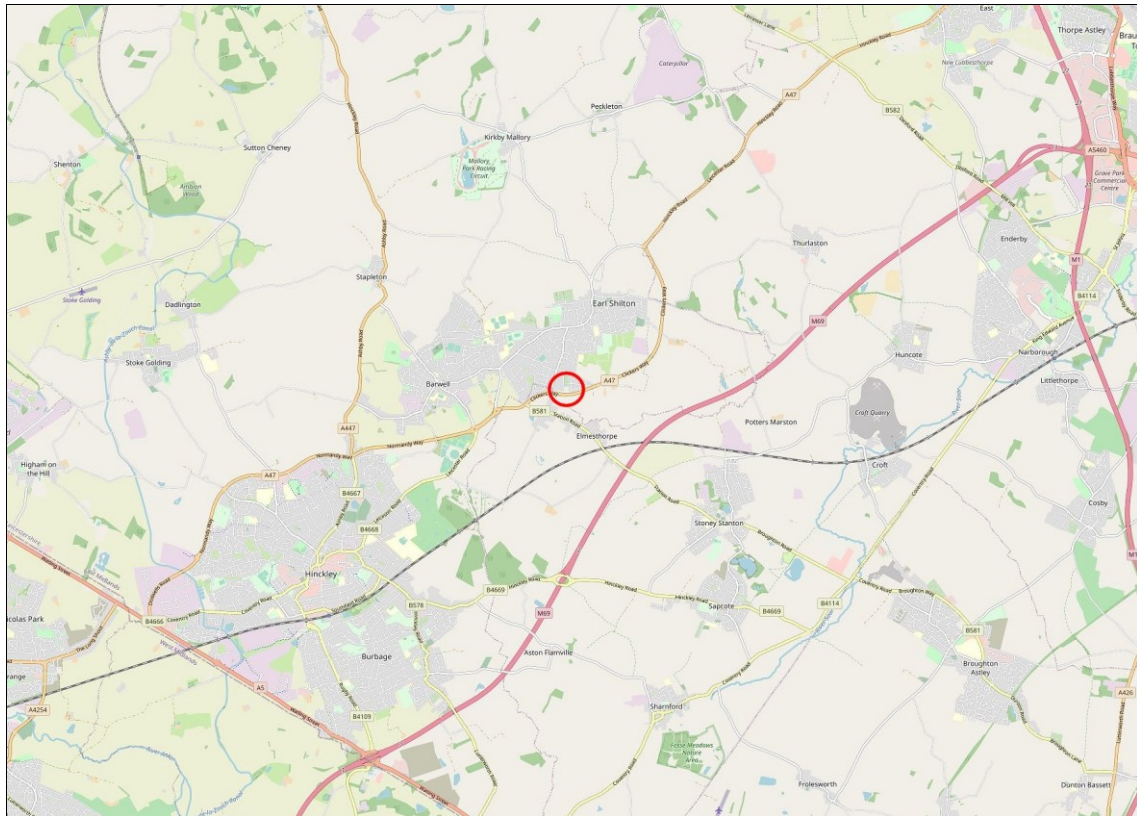


Figure 1. General Location Plan. Development Site circled in red. ©OpenStreetMap.





Figure 3. Archaeological Interpretation of Geophysical Survey Results. Supplied by Client.

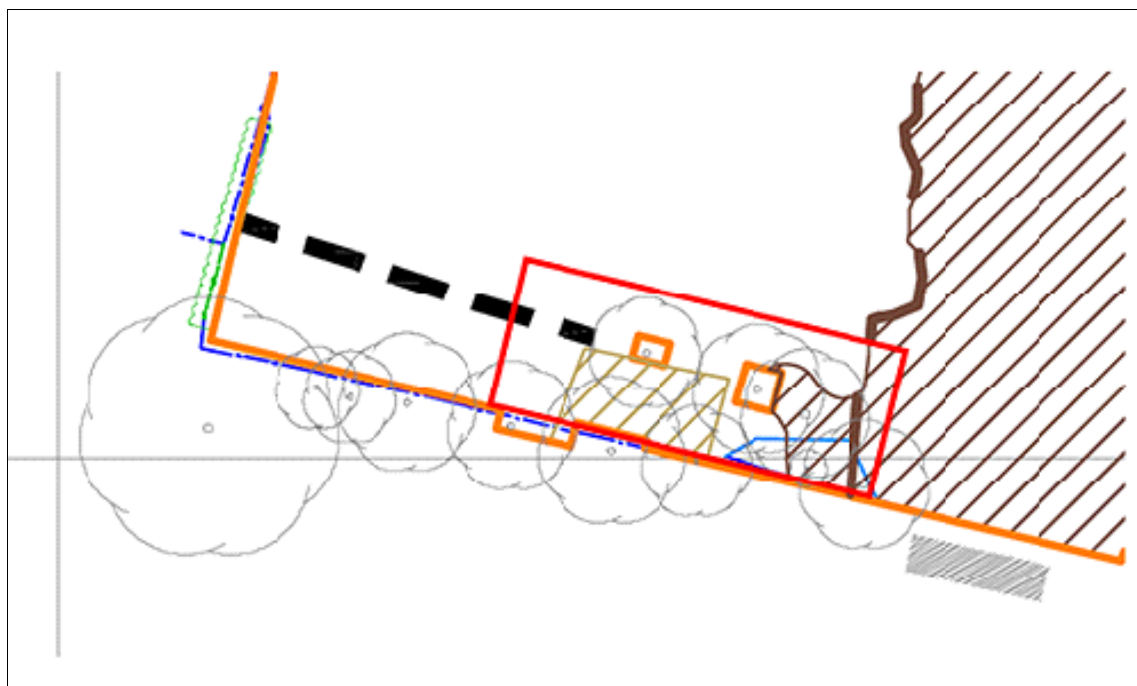


Figure 4. Archaeological Excavation Area Defined in Brief, outlined in red (Clark 2020).

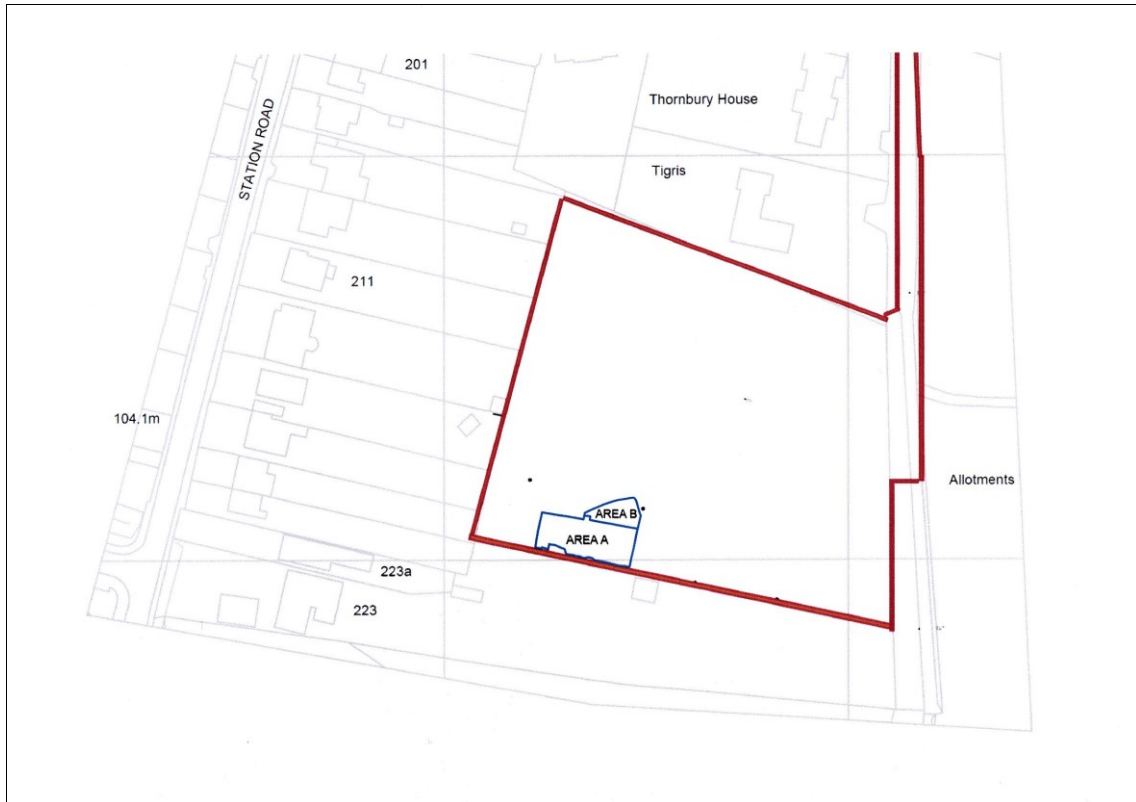


Figure 5. Location of Excavation Areas (in blue) in relation to Application Site (in red).

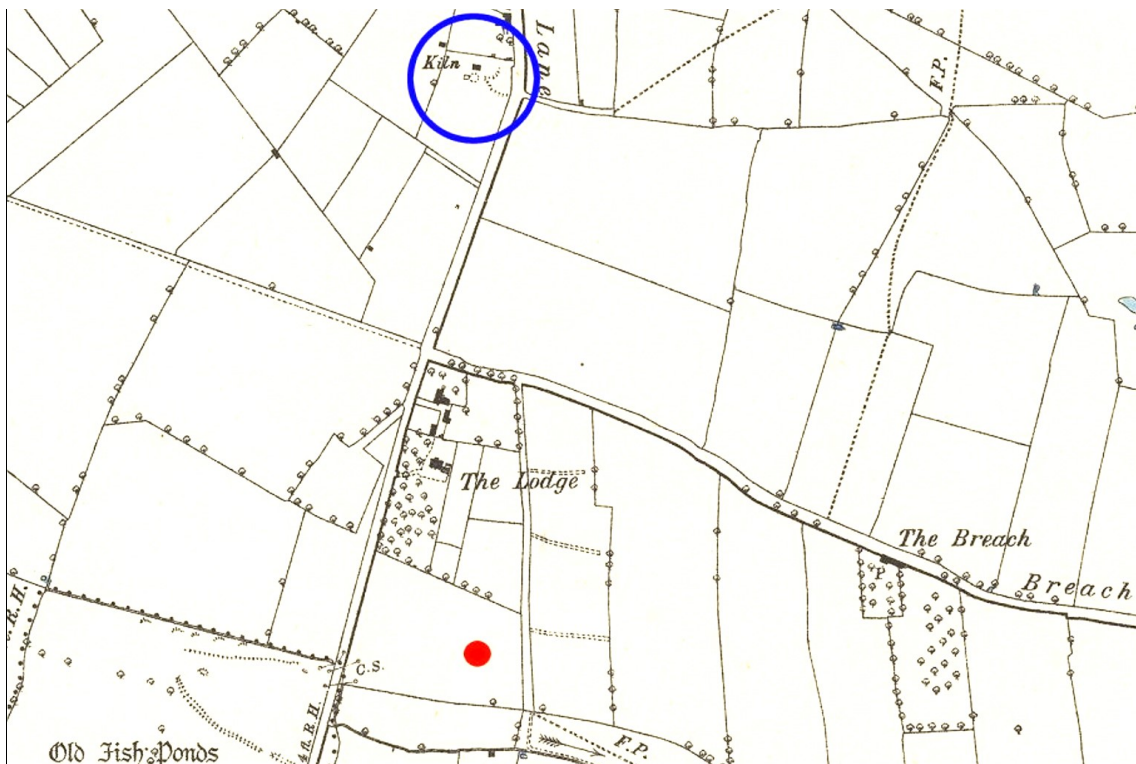


Figure 6. Detail of OS 1:10560 scale map sheet XXXVI.SW, surveyed 1886 and published 1887. The application site is indicated by the red dot; a ?brick kiln to the north is circled in blue.

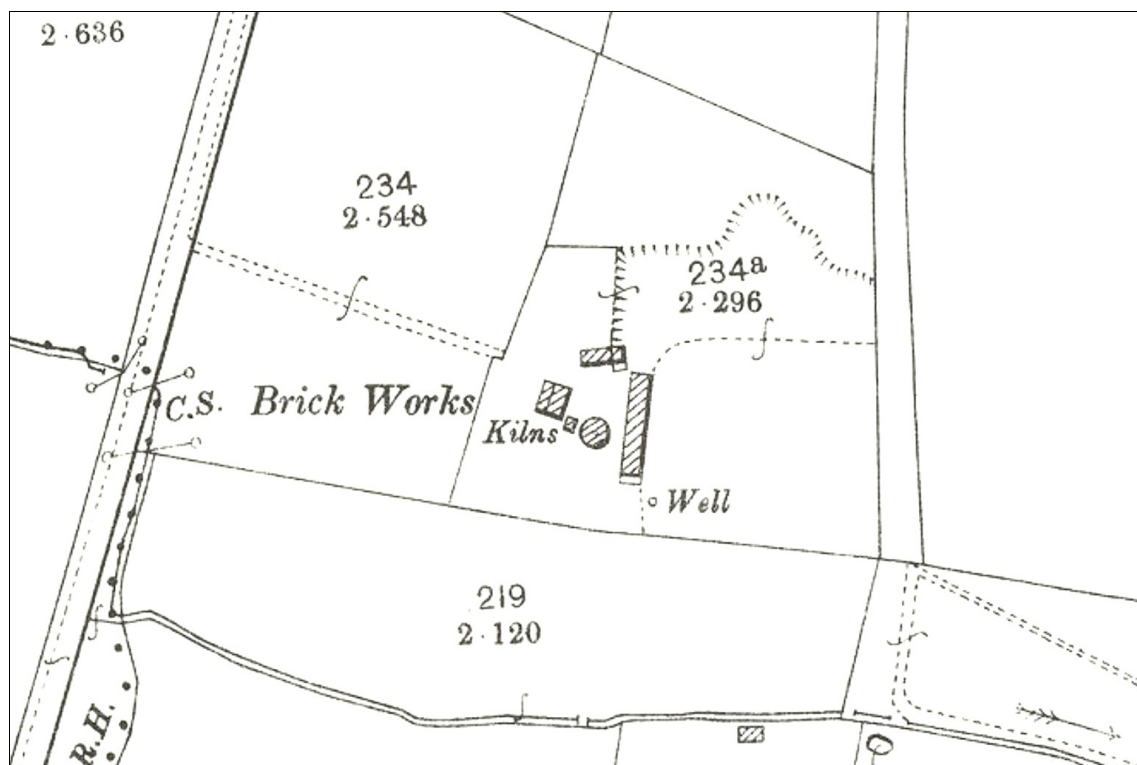


Figure 7. Detail of OS 1:2500 scale map sheet XXXVI.13, revised 1901 and published 1903.

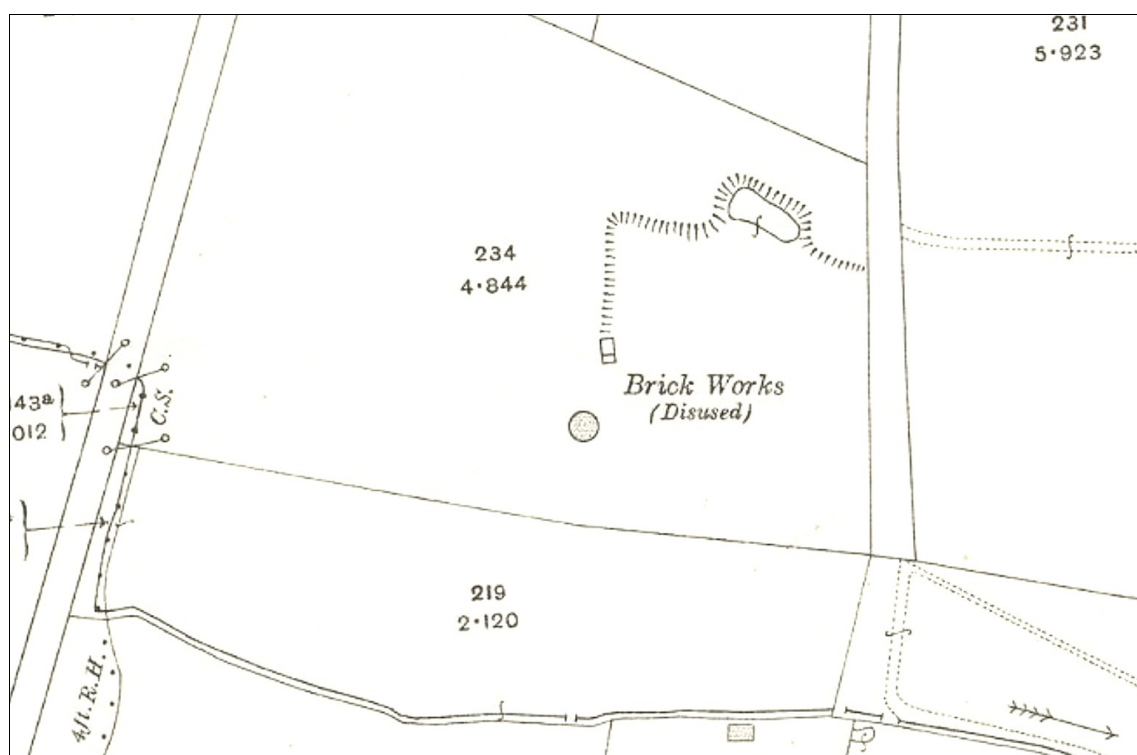


Figure 8. Detail of OS 1:2500 scale map sheet XXXVI.13, revised 1914 and published 1916.

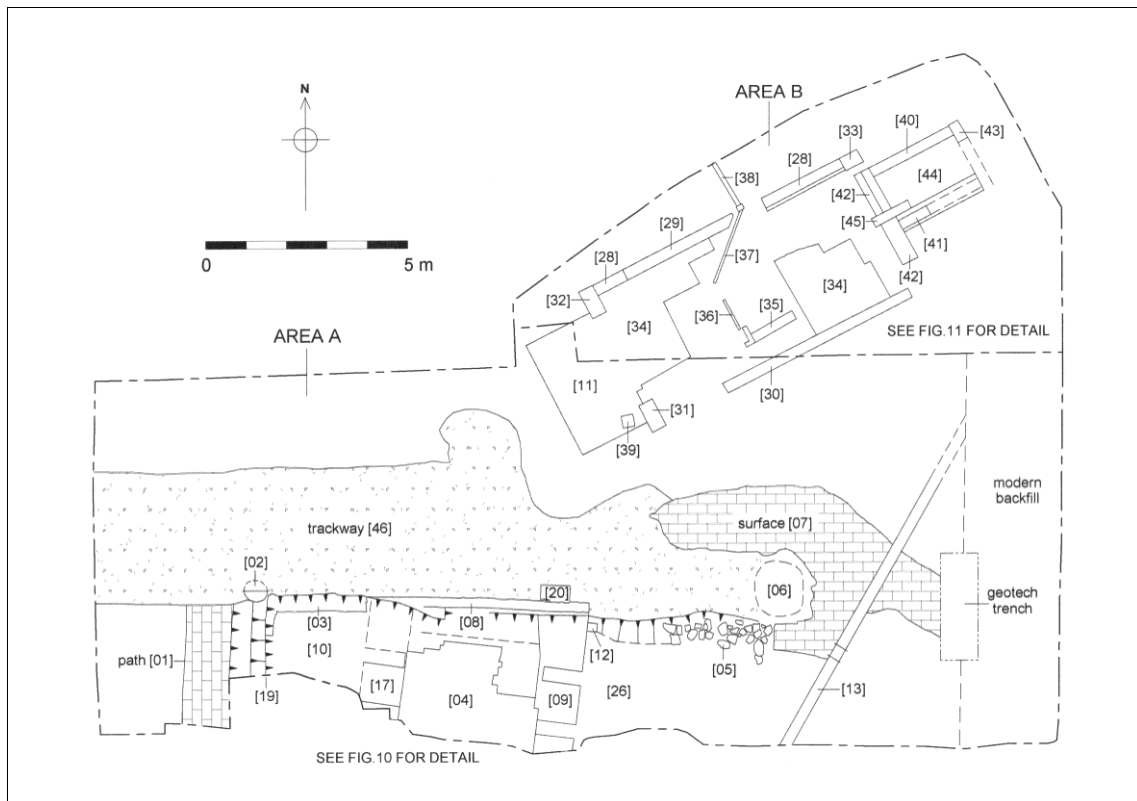


Figure 9. Excavation Plan showing principal features (Areas A and B).

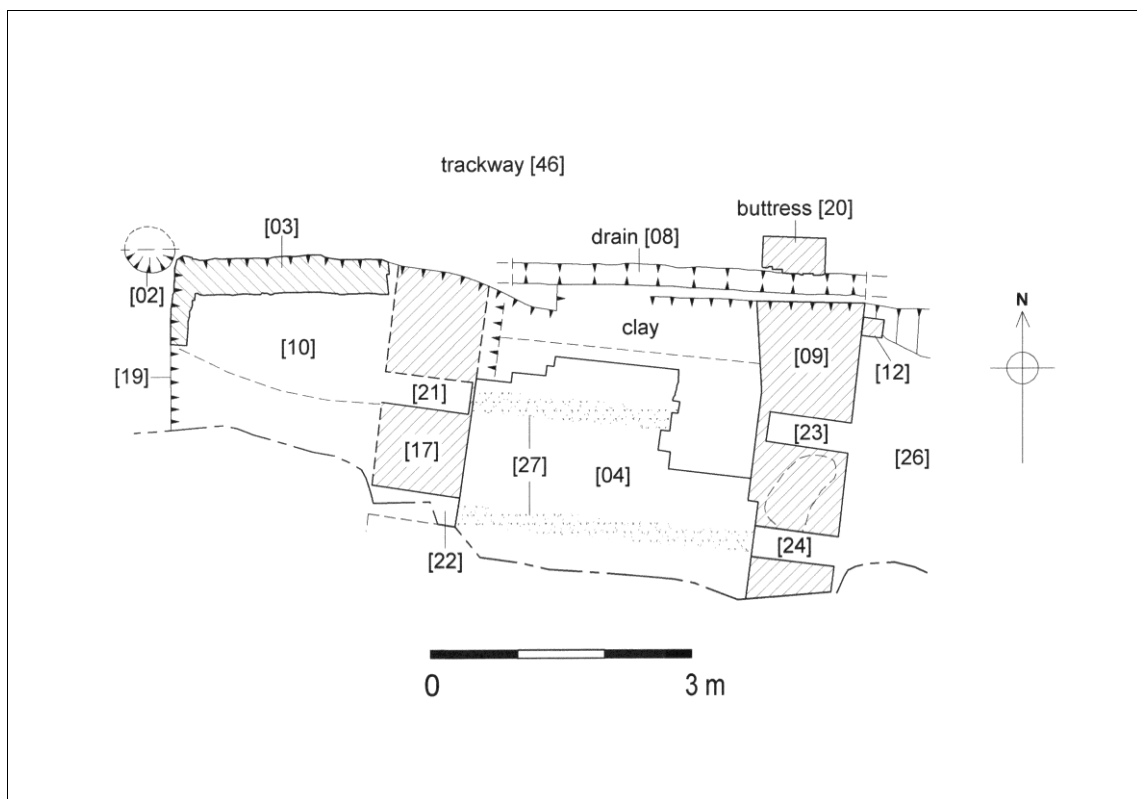


Figure 10. Plan showing remains of brick kiln and adjacent structure (surviving walls hatched).

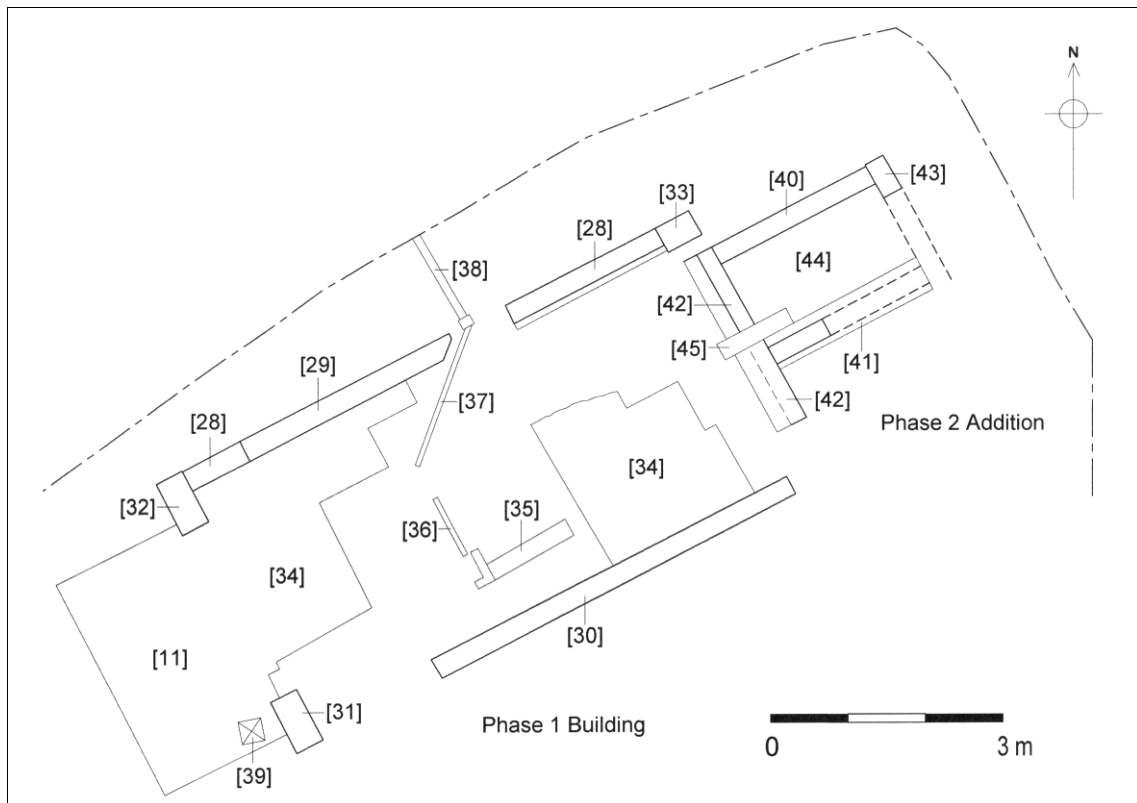


Figure 11. Plan showing remains of building in Area B.

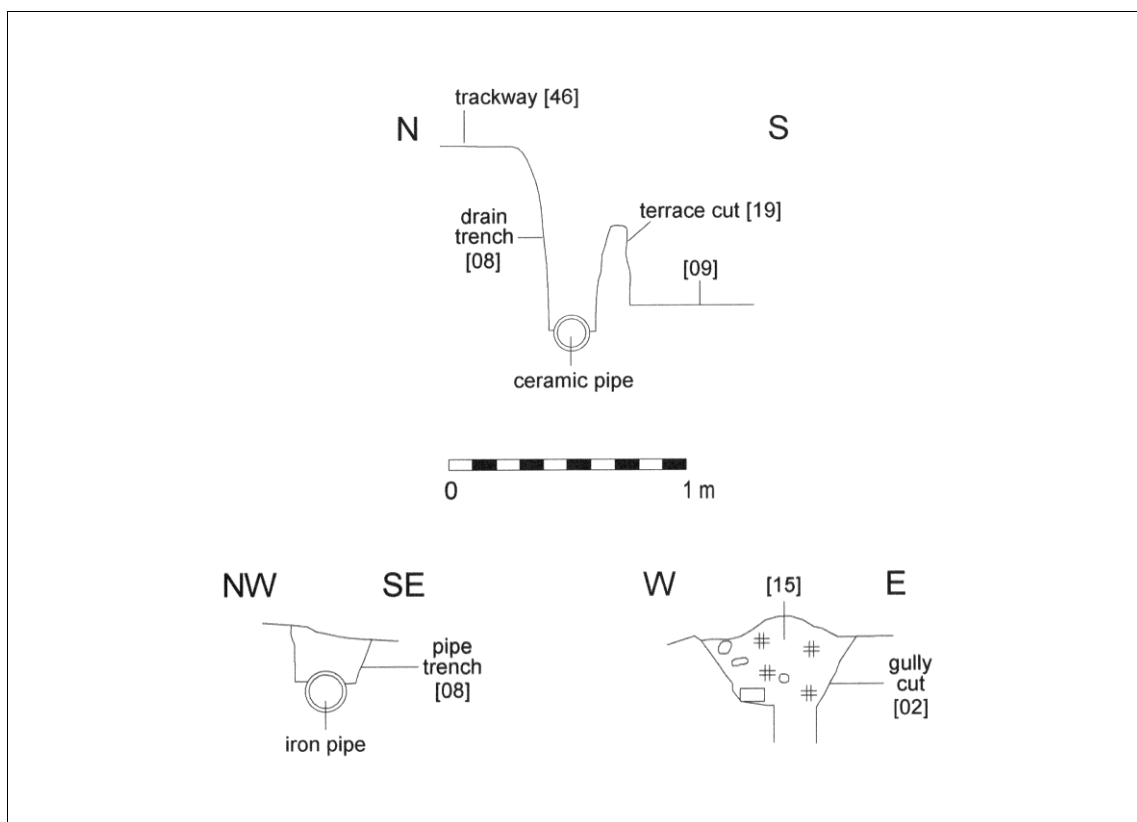


Figure 12. Excavated sections.

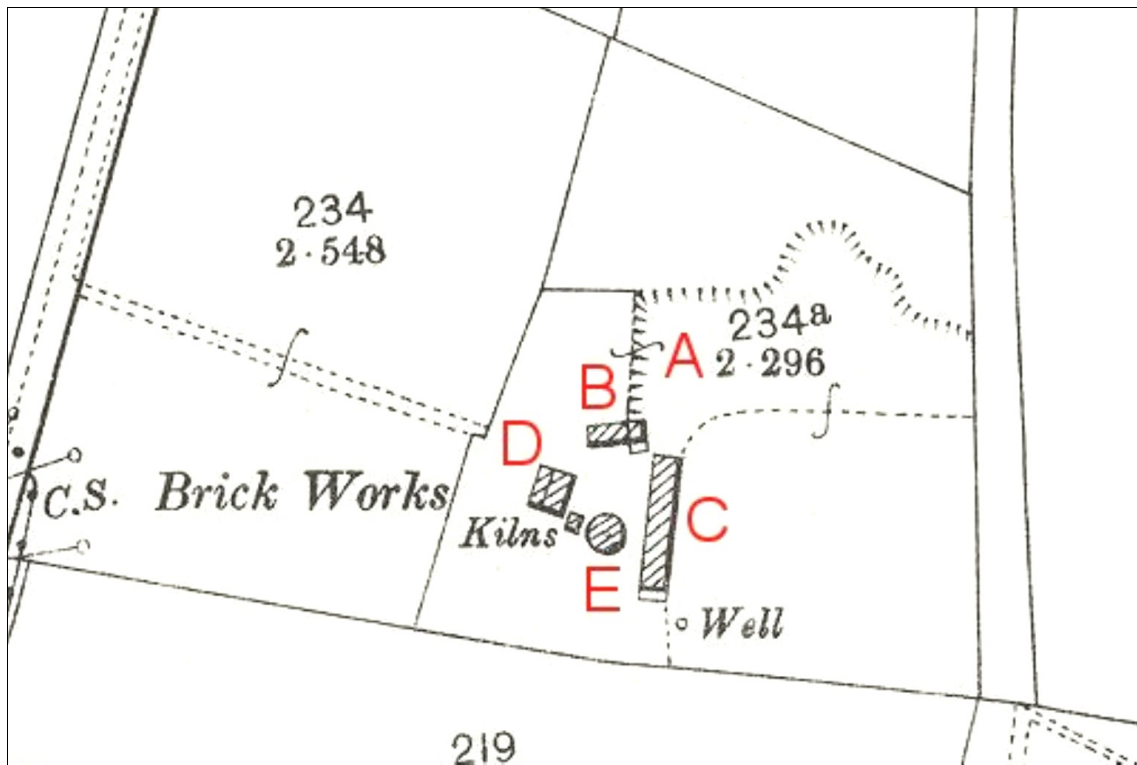


Figure 13. Detail of OS 1:2500 scale map sheet XXXVI.13, revised 1901 and published 1903. Key: A = Clay Pit; B = Moulding Shed; C = Drying Shed; D = Scotch Kiln; E = Beehive Kiln.



Figure 14. Scotch Kiln at Bottesford, Leicestershire in 1910. Note wicket closed with bricks laid in herringbone fashion and lean-to structure along side of kiln. Bottesford History Group.



Figure 15. Surviving Scotch Kiln on the Calke Abbey estate at Ticknall, Derbyshire.



Photo 1. General view of Area A during initial cleaning and definition of features, looking W.



Photo 2. General View of Area A during initial cleaning and definition of features, looking SE.



Photo 3. General view of Area A during excavation, with main features exposed, looking W.



Photo 4. General view of Area B during excavation with main features exposed, looking NE.



Photo 5. Remains of brick kiln; photo scales lying on base of firing chamber [04], looking E.



Photo 6. Remains of brick kiln and adjacent structure; surface [01] in foreground, looking SE.



Photo 7. Remains of E (on left) and W (on right) walls of kiln, with integral fireholes, looking S.



Photo 8. Remains of east wall of kiln [09], showing fireholes [23] and [24], looking SW.



Photo 9. East wall of kiln [09], fireholes [23] & [24] and buttress [20] in foreground, looking S.



Photo 10. Detail shot of firehole [23] with working surface [26] in foreground, looking W.



Photo 11. Base of firing chamber [04] with scorching [27] to base of fire channels, looking W.



Photo 12. Vitrified brick at base of fire channel [27] adjacent to firehole [21], looking W.



Photo 13. The photo scale lies on the un-scorched clay base of the removed N wall of the kiln, against terrace cut [19]. Right of this is drain trench [08] and buttress [20] above, looking W.



Photo 14. Brick floor [10] and retaining wall [03] of structure on west side of kiln, looking W.



Photo 15. Herringbone brick retaining walls [03] of structure on west side of kiln, looking NW.



Photo 16. Detail showing reused saddleback coping bricks in retaining wall [03], looking N.



Photo 17. East wall of kiln [09] and brick pier [12] (right) retaining terrace cut [19], looking N.



Photo 18. Half-sectioned cut [02] that probably accommodated a drainage gully, looking N.



Photo 19. Remains of Area B building, with external surface [11] in foreground, looking ENE.



Photo 20. Remains of Area B building, looking SW (Area A beyond is being backfilled).



Photo 21. Part of surface [11] and S wall foundation [30] as exposed in Area A, looking ENE.



Photo 22. Iron water pipes [37] and [38] beyond north wall foundation [29], looking WNW.



Photo 23. Part of north wall foundation of Area B building composed of reused drainage bricks [29] and internal floor surface [34], looking WNW.



Photo 24. Drainage gully with iron grid [39] set into external surface [11] outside SW corner of Area B building, looking N.



Photo 25. Truncated remains of Phase 2 element of Area B building, looking S.



Photo 26. Clinker surface of access trackway [46], looking E, with excavated kiln on right.



Photo 27. External brick and granite surface [07], continuing line of trackway [46] then turning to south, looking W.



Photo 28. External surface [07] with granite kerb/low retaining wall [05] on right, looking E.



Photo 29. Granite kerb/low retaining wall [05] on right of 2m scale, with feature [06] beyond 1m photo scale, looking E.



Photo 30. Iron pipe in pipe trench [13], cut through surface [07], looking NE.



Photo 31. External brick path [01], on south side of access trackway [46], looking S.