Layer de la Haye WTW Enhancement
Layer de la Haye, Essex

Post-excavation Assessment

Planning Authority: Colchester Borough Council
HER Site Code: ECC4710
Ref: 263800.3
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County	Essex
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Summary

Wessex Archaeology was commissioned by Stantec UK to conduct a strip, map and sample excavation covering 1.3 hectares adjacent to Layer de la Haye Water Treatment Works as part of a programme of archaeological mitigation prior to submission of a planning application to improve the existing facilities. The excavation, centred on NGR 596482 219805, is part of a series of archaeological investigations within the site which have included a desk-based assessment, and an archaeological trial trench evaluation. An archaeological watching brief is planned for future works but will be reported on separately. The former investigations were conducted over a considerable timeframe, with the evaluation being undertaken in 2005, and the desk-based assessment in 2022.

The trial trench evaluation highlighted two foci of archaeological interest within the proposed red line boundary for the site. The site has been divided up into three areas, all works discussed within this report pertain to Area C. The foci were located in the north-west corner in the vicinity of a previously recorded crop mark and the south-west corner of Area C, this excavation was located on the eastern and central portion of Area C. The previously recorded archaeological remains dated from the Neolithic period through to the post-medieval period. The evaluation recorded sherds of Neolithic pottery from a single pit, a series of late Iron Age features, including three cremation burials, pits and ditches, 13th century field enclosures and post-medieval ditches and a possible trackway. However, this excavation only revealed six small pits whereby four of them were sampled for environmental assessment. The features sampled were identified as the truncated remains of charcoal production pits variously (and poorly) dated between the Iron Age, Romano-British and medieval periouds. Further radiocarbon dating of two single entity samples from pit 3304 would be able to establish the accurate date of the assessed pits. The excavation was undertaken between the 13th June and the 4th July 2022.

Acknowledgements

Wessex Archaeology would like to thank Stantec UK, for commissioning the archaeological mitigation works, in particular Catherine Barnett and Rachel Legge. Wessex Archaeology is also grateful for the advice of Simon Wood, Archaeological Advisor to Colchester Borough Council, who monitored the project for Colchester Borough Council, and to Kay Silver from Essex and Suffolk Water for her cooperation and help on site.

Layer de la Haye WTW Enhancement, Layer de la Haye, Essex

Post-excavation Assessment

1 INTRODUCTION

1.1 Project and planning background

1.1.1 Wessex Archaeology was commissioned by Stantec UK, to undertake archaeological mitigation works comprising a strip, map and sample excavation covering 1.3 ha centred on NGR 596482 219805, at land south of Birch Road, Layer de la Haye, Essex, CO2 0EJ (Fig. 1).

1.1.2 The proposed scheme is for a series of enhancements to the WTW, comprising the construction of a new mecana filter unit and potential washwater plant within the existing WTW compound (Area A), an extension to incorporate a new sandwashing plant to the west of the existing WTW compound (Area C), and a potential reedbed solution at Layer Pit to the east of the WTW compound (Area B).

1.1.3 Consent for the scheme is yet to be granted at the time of writing, however it is expected a standard planning condition will be attached to the granting of consent. This post-excavation assessment relates solely to the archaeological mitigation which has been undertaken within Area C; future work in relation to the scheme is probable and will be reported on separately. The excavation is taking place prior to planning application being submitted.

1.1.4 The excavation was preceded by archaeological works, including an archaeological trial trench evaluation (Essex County Council Field Archaeology Unit 2005), a geophysical survey which included a detailed gradiometer survey and an earth resistance survey (AOC 2021), and a desk-based assessment (DBA: Stantec UK 2022) which identified two concentrations of archaeological remains, in the north-west and south-west corners of Area C (Fig. 1).

1.1.5 The excavation was undertaken in accordance with a written scheme of investigation (WSI), which detailed the aims, methodologies and standards to be employed, for both the fieldwork and the post-excavation work (Wessex Archaeology 2022a). The Archaeological Advisor at Colchester Borough Council (AA at CBC) approved the WSI, on behalf of the Local Planning Authority (LPA), prior to fieldwork commencing. The excavation was undertaken between the 13th June and the 4th July 2022.

1.2 Scope of the report

1.2.1 The purpose of this report is to provide the provisional results of the excavation, and the preceding evaluation, and to assess the potential of the results to address the research aims outlined in the WSI. Where appropriate, it includes recommendations for a programme of further analysis, outlining the resources needed to achieve the aims (including the revised research aims arising from this assessment), leading to dissemination of the archaeological results via publication and the curation of the archive.

1.3 Location, topography and geology

1.3.1 The excavation area is located to the south-west of Layer de la Haye village, approximately 1.5 km southwest of Colchester, Essex (Fig.1). The site is separated in to three areas Layer de la Haye WTW (Area A), Layer Pit (Area B) and part of an agricultural field directly west of the existing WTW compound (Area C). This report relates to Area C only.

1.3.2 Area C comprises an area of approximately 7.5 ha of agricultural land located directly west of the existing WTW compound. The field was cultivated and separated from the WTW by a metal fence.

1.3.3 Existing ground levels are 40 m above Ordnance Datum (aOD).

1.3.4 The underlying geology is mapped as clay, silt and sand of London Clay Formation with superficial deposits of sand and gravel of the Lowestoft Formation and the Kesgrave Catchment Subgroup (British Geological Survey 2022).

2 ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

2.1 Introduction

2.1.1 The archaeological and historical background was assessed in a prior desk-based assessment (DBA: Stantec UK 2022), which considered the recorded historic environment resource within a 1 km study area surrounding the proposed development. A summary of the results is presented below, with relevant entry numbers from the Colchester Historic Environment Record (CHER) and the National Heritage List for England (NHLE) included. Additional sources of information are referenced, as appropriate.

2.2 Previous works related to the development

Trial Trench Evaluation (Essex County Council Field Archaeology Unit 2005; ECC3693)

2.2.1 The evaluation comprised 32 trenches with the majority of the archaeological remains were identified in the north-western corner of the evaluated area on a slight plateau, with a smaller concentration recorded in the south-west corner (Fig. 2).

2.2.2 Evidence was uncovered for activity from the earlier prehistoric through to post-medieval periods (CHER: MCC5660), although no Roman or Saxon features were identified. These features included sparse pottery sherds from the late Neolithic period from a single pit, with early residual prehistoric pottery in later features, indicating early prehistoric activity in the area.

2.2.3 Three Late Iron Age urned cremation burials, two pits containing burnt material and possibly four ring ditches were identified. Although none of the ring ditches were dateable, due to their close proximity to the cremation burials, they were tentatively dated to the Late Iron Age.

2.2.4 Two other foci of activity were also identified, both comprising remains dating to the 13th century. Along Birch Road, comprised a series of medieval ditches in a seemingly perpendicular arrangement, possibly parts of small agricultural enclosures along the medieval road. In the south-west corner of the site was the final concentration, indicating the presence of small enclosures. The post-medieval remains present were primarily dispirit sections of field ditches. Although the remains of a trackway running east-west along the break of slope below the slight plateau may also date to this period.

Geophysical Survey (AOC Archaeology 2021)

2.2.5 An extensive geophysical survey (CHER: ECC4572), which comprised a combination of gradiometer and earth resistance survey, was conducted in 2020 by AOC Archaeology across 84ha within the western part of the study area, encroaching slightly into the western part of Area C. The survey identified features associated with Oliver's Layer/Layer Dyke (NHLE: 1002180; CHER: MCC7284), linear trends, possible field boundaries and land drains. An area of modern disturbance and services were identified in the southwestern corner of Area C.

2.3 Archaeological and historical context

Palaeolithic to Bronze Age (500,000 – 800 BC)

2.3.1 Sherds of late Neolithic pottery were recovered from a single pit (CHER: MCC5660) during the evaluation (CHER: ECC3693) within Area C. Further sherds of earlier prehistoric date were recovered, although these were residual in later features.

2.3.2 Neolithic occupation remains (CHER: MCC7417), comprising a pit containing a pottery bowl, a possible ditch and numerous fragments of burnt flint, were recorded during an excavation at Fields Farm (CHER: ECC3128), c 630m east of the site. Worked flints ranging between Palaeolithic and Bronze Age date (CHER: MCC7407; MCC7411; MCC7418-19) have also been recovered from across the south-eastern part of the study area.

Iron Age (800 BC – AD 43)

2.3.3 The evaluation (CHER: ECC3693, Figs. 6.1-6.5) within Area C recorded a concentration of late Iron Age features (CHER: MCC5660) concentrated in the vicinity of a previously identified cropmark complex. Three urned cremation burials were identified immediately to the west of the cropmark features, alongside potentially associated pits containing burnt material, and parts of four possible ring ditches. Two of the features corresponded to the cropmark plots however, none of the features contained any dateable evidence therefore an association with the cremation burials is not proven.

2.3.4 Oliver's/Layer Dyke (NHLE: 1002180), a scheduled late Iron Age defensive earthwork extends on a north-south alignment across the northern part of the study area. A possible extension to/branch of the dyke (CHER: MCC7285; MCC7694) has been recorded as a cropmark, to the south-west of the scheduled section, c 115m north of the site. These and several additional linear trends likely to be associated with the dyke system were identified during geophysical survey across this area (CHER: ECC4572).

2.3.5 Evidence of Iron Age settlement activity (CHER: MCC7408), comprising ditches containing pottery and fragments of baked clay, potentially derived from a hearth or oven, were recorded during the renovation of Malting Barn at Hill Farm (CHER: ECC3125), c 850m east of the site. Iron Age findspots have also been recorded across the study area, including two Gaulish coins (CHER: MCC7454; MCC8248), metal artefacts (CHER: MCC9597; MCC9809), pottery and flints (CHER: MCC 7414; MCC7771).

Romano-British (AD 43 – 410)

2.3.6 Roman bricks (CHER: MCC8654) have been re-used for the construction of the east quoins of the nave of St John the Baptist Church (Grade I, NHLE: 1223841), c 330m south of the site.

2.3.7 A Romano-British ditch dated to the 1st-century AD (CHER: MCC7409) producing pottery fragments including Arretine ware and an amphora handle was excavated during the renovation of Malting at Hill Farm (CHER: ECC3126), c 850m east of the site. Scatters of

pottery and tile, and a septaria (CHER: MCC 7368; MCC7412; MCC7420) have also been recovered from across the south-eastern part of the study area.

Medieval (AD 410 – 1500)

2.3.8 Layer (incorporating de la Haye, Breton and Marney) is first recorded in the Domesday Survey of 1086 as Legra, probably derived from the river-name Leire of celtic origin. The affix de Haya, which pertains to the family who held the manor, is first recorded in 1236.

2.3.9 Two areas of 13th-century activity, comprising a series of ditches (CHER: MCC5660), were identified during the evaluation (CHER: ECC3693), adjacent to Birch Road and within the southern-western corner of the evaluated area. The ditches appear to form parts of small agricultural enclosures, suggesting that this part of the site comprised part of a managed agricultural landscape during this period.

2.3.10 A medieval moated site/grange (CHER: MCC7309) is also recorded at Rye Farm, directly adjacent to the site. The eastern and southern sections of the moat remain extant, with the remaining area occupied by farm buildings. A 15th-century metal artefact (CHER: MCC9810) was found near Rye Farm, c 115m east of the site.

2.3.11 The Church of St John the Baptist (Grade I, NHLE: 1223841), which stands near the centre of the parish on Church Road, has 12th-century origins. Several further medieval buildings also survive within the parish including a 13th-century timber framed barn north of Blind Knights (Grade II, NHLE: 1223904), and the hall houses of Blind Knights (Grade II*, NHLE: 1267086) and Hill Farmhouse (Grade II, NHLE: 1223844) which date to the 14th-century. Great House Farmhouse (Grade II, NHLE: 1223948) and The Cross House (Grade II, NHLE: 1223839) date to the 16th-century.

2.3.12 Further medieval remains recorded within the study area comprise a ditch (CHER: MCC8076) identified during an excavation (CHER: ECC3270) at Blind Knights c 550m south-east of the site and medieval pottery scatters (CHER: MCC 7413; MCC7421) found across the south-eastern part of the study area.

Post-medieval (AD 1500 – 1800)

2.3.13 Post-medieval features recorded during the evaluation (CHER: ECC3693) comprised sections of field ditches and a possible trackway running on an east-west alignment through the site below a slight plateau in the landscape.

2.3.14 The earliest map to show the site is a 1735 Map of the Estate of John Brown Esquire. The map shows part of where Area C is located comprising a series of irregularly enclosed agricultural fields making up ‘Martin’s Farm’. A building, which may represent a house or agriculture structure, is illustrated within the site on the southern edge of Birch Road, and The Cross House (NHLE: 1223839) is shown alongside another building to the north of the site, near the junction of Birch Road and Church Road. Chapman and Andre’s 1777 Map of the County of Essex illustrates the whole site, albeit to a lesser degree of detail and accuracy, showing the site as comprising undeveloped land to the south of the settlement focus around the edge of Layer Heath. The building, formerly shown within the site on the estate map, is not illustrated and may have been demolished by this time.

Modern (1800 – present)

2.3.15 The field system was re-organised between the later 18th-century and earlier 19th-century, as indicated by the 1838 Tithe map for Layer de la Haye which illustrates larger, more regular plots than shown on the estate map. The Tithe map also shows that a gravel pit/s had been excavated within the eastern part of the site by this time. Historic Ordnance

Survey mapping shows that the gravel pit/s expanded during the later 19th-century. A chapel (MCC9320) is also shown by later 19th-century maps on the northern side of Birch Road, a short distance north of the site. The location of the chapel is consistent with the position of 4 & 5 Birch Road (NHLE: 1223836) and may represent the same building.

2.3.16 Layer de la Haye WTW (CHER: MCC5070) was developed by the then South Essex Waterworks Co. between 1936 and 1939, having gained powers to abstract water from the River Stour near Stratford St. Mary in Suffolk from where it was pumped to the treatment works before being stored at the Abberton impounding reservoir (located within the south-eastern part of the study area). The original WTW infrastructure consisted of the boiler house and pumping hall, filter block, six filter beds and covered service reservoirs. The WTW site also incorporated the 'Essex Water Company Estate' (CHER: MCC4084), a development of workers cottages on the southern perimeter of the works (Waterworks Close) consisting of three detached and six pairs of semi-detached buildings, provided by the South Essex Waterworks Co. The WTW expanded in the 1960-70s with the addition of 14 filter beds/tanks.

2.3.17 The principal structure within the WTW is the boiler house and pumping station located within the south-eastern part of the compound. It comprises a white concrete building with medium sized metal windows, wooden doors and a flat roof, characteristic of the International Modern Movement architectural style, and originally had a tall chimney. The contemporary filter block, located toward the centre-east of the compound is built in a similar architectural style.

2.3.18 The gravel pit located within the eastern part of the site continued to expand up until the mid-20th-century, when upon its disuse was converted into a fishing lake.

Undated

2.3.19 Undated assets recorded within the study area primarily comprise cropmark features (CHER: MCC4745; MCC7072; MCC7399; MCC7397; MCC7416; MCC7703; MCC7742; MCC7764; MCC8691; MCC8700; MCC8701).

2.3.20 A series of cropmarks (CHER: MCC7416) identified within the western part of the site appearing to comprise a possible rectilinear enclosure and potential ring ditches, were targeted by the evaluation (CHER: ECC3693), which placed five trenches over the features, as plotted by the NMP. Some of the cropmarks identified by the NMP were confirmed to be present as below-ground features, comprising linear and curvilinear ditches, although at least two were shown to be of natural/geological origin. Some discrepancy was also noted between the rectified cropmark plot and actual feature locations. Whilst a number of late Iron Age features were concentrated around the cropmarks, two identified ring ditches did not contain any dateable evidence.

2.3.21 Further cropmark features (CHER: MCC4745; MCC7397; MCC7399), representing former field boundaries, trackways, potential enclosures, ring ditches and pits, and other undetermined linear features, are recorded directly adjacent to the eastern part of the site.

3 AIMS AND OBJECTIVES

3.1 Aims

3.1.1 The general aims of the excavation, as stated in the WSI (Wessex Archaeology 2022a) and in compliance with the Chartered Institute for Archaeologists' *Standard and guidance for archaeological excavation* (CIfA 2014a), were to:

- examine the archaeological resource within a given area or site within a framework of defined research objectives;
- seek a better understanding of the resource;
- compile a lasting record of the resource; and
- analyse and interpret the results of the excavation and disseminate them.

3.2 Research objectives

3.2.1 Following consideration of the archaeological potential of the site and the regional research framework (EERF 2011), the research objectives of the excavation defined in the WSI (Wessex Archaeology 2022a) were to:

- establish information on the nature and extent of the underlaying natural deposits;
- examine evidence for prehistoric (Neolithic) domestic activity on site;
- examine evidence of late Iron Age settlement activity and features associated with the Iron Age defensive earthworks;
- examine evidence of Romano British activity on site;
- examine evidence of medieval and post-medieval remains associated with agricultural activity; and
- assess the potential for the recovery of artefacts to assist in the development of type series within the region.

4 METHODS

4.1 Introduction

4.1.1 All works were undertaken in accordance with the detailed methods set out within the WSI (Wessex Archaeology 2022a) and in general compliance with the standards outlined in CIfA guidance (CIfA 2014a). The post-excavation assessment and reporting followed advice issued by the Association of Local Government Archaeological Officers (ALGAO 2015). The methods employed are summarised below.

4.2 Fieldwork methods

General

4.2.1 The excavation area was set out using a Global Navigation Satellite System (GNSS), in the same position as that proposed in the WSI. However, due to on site constraints and following consultation with the client and the AA at CBC, the excavation area was reduced from the proposed 1.6 ha to 1.3 ha in size (Fig. 2). The topsoil/overburden was removed in level spits using a 360º excavator equipped with a toothless bucket, under the constant supervision and instruction of the monitoring archaeologist. Machine excavation proceeded in level spits until the archaeological horizon, or the natural geology was exposed.

4.2.2 Where necessary, the surfaces of archaeological deposits were cleaned by hand. A sample of archaeological features and deposits was hand-excavated, sufficient to address the aims of the excavation. A sample of natural features, such as tree-throw holes, was also investigated.

4.2.3 Spoil derived from machine stripping and hand-excavated archaeological features was visually scanned for the purposes of finds retrieval. A metal detector was also used. Artefacts were collected and bagged by context. All artefacts from excavated contexts were retained, although those from features of modern date (19th century or later) were recorded on site and not retained.

Recording

4.2.4 All archaeological features and deposits were recorded using Wessex Archaeology's pro forma recording system. A complete record of excavated features and deposits was made, including plans and sections drawn to appropriate scales (generally 1:20 or 1:50 for plans and 1:10 for sections) and tied to the Ordnance Survey (OS) National Grid.

4.2.5 A Leica GNSS connected to Leica's SmartNet service surveyed the location of archaeological features. All survey data is recorded in OS National Grid coordinates and heights above OD (Newlyn), as defined by OSTN15 and OSGM15, with a three-dimensional accuracy of at least 50 mm.

4.2.6 A full photographic record was made using digital cameras equipped with an image sensor of not less than 16 megapixels. Digital images have been subject to managed quality control and curation processes, which has embedded appropriate metadata within the image and will ensure long term accessibility of the image set.

4.3 Finds and environmental strategies

General

4.3.1 Strategies for the recovery, processing and assessment of finds and environmental samples were in line with those detailed in the WSI (Wessex Archaeology 2022a). The treatment of artefacts and environmental remains was in general accordance with: *Guidance for the collection, documentation, conservation and research of archaeological materials* (CIfA 2014b), *Environmental Archaeology. A Guide to the Theory and Practice of Methods, from Sampling and Recovery to Post-excavation* (English Heritage 2011) and CIfA's *Toolkit for Specialist Reporting* (Type 2: Appraisal).

4.4 Monitoring

4.4.1 The AA at CBC monitored the works on behalf of the LPA. Any variations to the WSI, if required to better address the project aims, were agreed in advance with the client and the AA at CBC.

5 STRATIGRAPHIC EVIDENCE

5.1 Introduction

Summary of archaeological features and deposits

5.1.1 A total of six small undated pits were recorded during the excavation. The only other features noted during the excavation were two land drains. No further features or deposits were recorded.

5.1.2 The preceding evaluation had highlighted two main areas in which archaeological remains had been recorded, this excavation was located away from these foci of archaeology.

Methods of stratigraphic assessment and quantity of data

5.1.3 All hand written and drawn records from the excavation have been collated, checked for consistency and stratigraphic relationships. Key data has been transcribed into a database,

which can be updated during any further analysis. Preliminary phasing of archaeological features and deposits was principally undertaken using stratigraphic relationships.

5.2 Soil sequence and natural deposits

5.2.1 The overburden comprised a 0.15 m thick mid yellowish brown silty sand plough soil, this overlay a 0.20 m thick light yellowish brown silty sand subsoil. Both the plough soil and subsoil were very compacted. The natural geology was a light reddish yellow silty sand with common to abundant gravels.

5.3 Uncertain date

5.3.1 A total of six undated pits were recorded. These pits were between 0.63 m to 0.96 m in length, 0.65 m to 0.94 m in width with a maximum recorded depth of just 0.29 m. The pits were either circular (pits 3304, 3309 Figs. 3 and 4, and 3312) or oval (pits 3307, 3314 Figs. 3 and 5 and 3316 Figs. 3 and 6) in shape and all had shallow or moderate concave sides and concave bases, except for pit 3307 which had an irregular or undulating base.

5.3.2 The pits were all located in the northern third of the excavation area, with three pits (3307, 3309 and 3312) clustered together.

5.3.3 The pits recorded by this excavation had similar morphologies to the two undated pits recorded in this area by the evaluation where pit 47 (in trench 20: Fig. 2) measured 0.57 m long, 0.63 m wide, 0.18 m deep and pit 79 (trench 17: Fig. 2) measured 0.61 m long, 0.98 m wide and 0.35 m deep, with charcoal flecks noted in the fills of both of these pits, but like the pits recorded in the excavation, no datable finds were recovered (Essex County Council Field Archaeology Unit 2005). Gully 97 recorded in trench 17 was identified as a natural depression by the excavation. Other features recorded in the evaluation that the excavation demonstrated were natural depressions included spread 62 and ditch 85, with ditch 85 the report was tentative in the original interpretation.

6 FINDS EVIDENCE

6.1 Introduction

6.1.1 No artefacts were retrieved during the excavation.

6.1.2 Although artefacts including Neolithic pottery, Iron Age pottery, medieval pottery, fired clay, ceramic building material, worked and unworked stone and cremated human remains were recovered in the 2005 evaluation, these features were focused away from this excavation area.

7 ENVIRONMENTAL EVIDENCE

7.1 Introduction

7.1.1 Four bulk sediment samples were taken from four undated pits. The samples were processed for the recovery and assessment of environmental evidence.

7.2 Aims and methods

7.2.1 The aim of this assessment is to determine the nature and significance of the environmental remains preserved at the site, and their potential to address project aims. This assessment has been undertaken in accordance with Historic England's guidelines (English Heritage 2011).

7.2.2 The size of the bulk sediment samples varied between 10 and 40 litres, with an average volume of approximately 25 litres. The samples were processed by standard flotation methods on a Siraf-type flotation tank; the flot retained on a 0.25 mm mesh, residues fractionated into 4 mm and 1 mm fractions. The coarse fractions of the residues (>4 mm) were sorted by eye for artefactual and environmental remains.

7.2.3 The flots and fine residue fractions were examined using a Brunel BMSZ stereomicroscope at up to x40 magnification. Different potential indicators of bioturbation were noted, including the percentage of modern roots and abundance of modern seeds, burrowing blind snails (e.g., Cecilioides acicula), earthworm eggs, and modern insects. Selected charcoal fragments were identified through examination of the transverse, tangential longitudinal, and radial longitudinal sections at up to x400 magnification using a Kyowa ME-LUX2 microscope. Charcoal identifications were assisted by the descriptions of Gale and Cutler (2000), Hather (2000), and Schweingruber (1990), together with modern reference material held by Wessex Archaeology. Nomenclature follows Stace (1997).

7.3 Results

7.3.1 The results are presented in Appendix 1, Table 1. The four pits sampled produced flots which are exceptionally rich in wood charcoal. Charred plant remains are absent. There are occasional modern roots within the samples, probably due to the shallow depth of the features sampled.

7.3.2 The charcoal assemblage primarily consists of oak (*Quercus* sp.), alongside some fragments identified as oak/chestnut (*Quercus/Castanea*). The presence of mature heartwood is indicated by the weak growth ring curvature and abundant tyloses observed. Some of the fragments have wide growth rings (indicating fast growing conditions).

7.3.3 The microscopic wood anatomy of the two native deciduous oaks – Pedunculate Oak (*Q. robur*) and Sessile Oak (*Q. petraea*) – closely resembles that of Sweet Chestnut (*Castanea sativa*) and it is not always possible to differentiate between these. The key microscopic anatomical characteristics of the oak species and sweet chestnut are summarised below:

> Pedunculate/Sessile Oak (*Q. robur/petraea*): Ring porous vessel pattern with a flame-like distribution of smaller, latewood vessels. Rays are uniseriate and multiseriate (very wide). The wood of the two native oak species cannot be differentiated.
>
> Sweet Chestnut (*Castanea sativa*): Ring porous vessel pattern with a flame-like distribution of smaller, latewood vessels. Rays are uniseriate (rarely biseriate).

7.3.4 The presence/absence of multiseriate rays is the only criterion which can be used to distinguish between oak and sweet chestnut. Oak has been securely identified in the assemblage from the presence of multiseriate rays. However, multiseriate rays could not be observed in some of the fragments examined despite their relatively large size (i.e., >4 mm). This may, however, be due to preservation conditions since vitrification and radial cracks are common, and the fragments were often friable. These factors make it difficult to securely confirm the presence/absence of multiseriate rays (cf. Jarman *et al.* 2019a). In order to identify sweet chestnut, there needs to be clear evidence that multiseriate rays are absent, although this is often difficult to confirm in archaeological charcoal assemblages. In addition, a complicating factor is that multiseriate rays can be absent in oak where the wood is abnormal/twisted and growing conditions are fast (Schweingruber 1990). Consequently, where it could not be securely determined that a fragment was oak, then these were

grouped as oak/chestnut. Given that oak has been positively identified, it is likely that many of the oak/sweet chestnut fragments also derive from oak.

7.4 Discussion

7.4.1 The features sampled can be identified as the truncated remains of charcoal production pits/clamp kilns. This interpretation is based on their shallow depth and charcoal-rich fills which contain a very low diversity of taxa (one, possibly two species). Closely comparable features have been identified in numerous archaeological investigations around Colchester where oak was the main wood species recorded (e.g., Archaeological Services Durham University 2019; Colchester Archaeological Trust 2018, 2019, 2020a, 2020b; Oxford Archaeology 2021). These production pits have been variously dated between the Iron Age, Romano-British, and medieval period, although they are generally poorly dated and some may contain earlier residual material.

7.4.2 Charcoal production was undertaken within, or close to woodlands, and the method of production involved placing the wood in a circular stack which was in turn sealed with small branches (or a similar material such as bracken) and earth/turf to restrict the supply of oxygen (Bond 2007). Charcoal was valued as a fuel source in metalworking (e.g., iron smelting, smithing), as well as other industries (e.g., glass production) and cooking. Where well-dated, this form of charcoal production using a pit is generally typical of the medieval period, often pre-dating the 12th-13th centuries (e.g., Challinor 2011; Druce 2019; López-Dóriga and Treasure 2022; Webley 2007; Wessex Archaeology 2022b). Further work is needed to understand the methods of charcoal production in different periods. Oak was widely exploited for charcoal production, although a range of other wood species were also used (Bond 2007; Gale and Cuttler 2000). Whilst no charcoal fragments have been securely identified as sweet chestnut from the site, this species was widely managed for charcoal production in south-eastern England during the medieval period (Jarman *et al*. 2019b). Sweet chestnut is a medieval introduction which is now widely naturalised in woodlands (Jarman *et al*. 2019a).

8 STATEMENT OF POTENTIAL

8.1 Stratigraphic potential

8.1.1 A total of 17 contexts were recorded during the excavation. Due to the limited number and type of features found there is little stratigraphic potential from the excavation.

8.2 Environmental potential

8.2.1 The charcoal assemblage is of local significance, although it would be beneficial to understand how these charcoal production pits relate to others across the region. There is some scope for further analysis of the charcoal to provide additional information on woodland exploitation practices and the nature of charcoal production. It would be particularly beneficial to obtain secure dating evidence for these features since they are often poorly dated. A paired radiocarbon date could be obtained from pit 3304 which appears to be the best preserved of these features. However, depending on the availability of suitable short-lived samples of wood charcoal, it may be necessary to obtain radiocarbon dates from another feature.

8.3 Recommendations

8.3.1 Additional work should focus on establishing the dating of the charcoal production pits. The results outlined in this report could then be updated and revised for inclusion in a subsequent report.

8.4 Scientific dating

8.4.1 It is recommended that two single-entity samples of charcoal are submitted for radiocarbon dating from pit 3304. If no suitable short-lived samples of charcoal are present in pit 3304, it would be preferable to obtain radiocarbon dates from one of the other pits. Paired radiocarbon dating is necessary to obtain an accurate date for the feature(s). Appropriate samples for dating will be selected through further examination of the charcoal.

8.5 Summary of potential

8.5.1 The excavation broadly supports the results from the much earlier evaluation and clearly demonstrates the limited archaeology within the central portion of Area C. Although the preceding evaluation had recorded a ditch, a gully, two pits and a spread of material, the linear features appear to be depressions within the natural as no coherent linear features were identified within the vicinity of the features recorded in the evaluation; supporting the hypothesis suggested by the evaluation report that these were natural depressions. The six pits recorded by the excavation increase the number of small pits to eight, whereby two samples of charcoal would benefit for radiocarbon dating from pit 3304 to establish dating of the pit. If suitable, short-lived samples for radiocarbon dating cannot be identified from pit 3304, samples could instead be submitted for dating from one of the other charcoal production pits.

8.5.2 It is recommended that publication takes the form of a short note with appropriate illustrations for inclusion in the journal *Essex Archaeology and History*. This will be prepared by Wessex Archaeology.

9 STORAGE AND CURATION

9.1 Museum

9.1.1 The archive resulting from the excavation is currently held at the offices of Wessex Archaeology in Salisbury. Colchester has agreed in principle to accept the archive on completion of the project, under the HER code **ECC4710**. Deposition of any finds with the museum will only be carried out with the full written agreement of the landowner to transfer title of all finds to the museum.

9.2 Preparation of the archive

Physical archive

9.2.1 The physical archive, which includes paper records, graphics, artefacts and ecofacts, will be prepared following the standard conditions for the acceptance of excavated archaeological material by Colchester Museum, and in general following nationally recommended guidelines (Brown 2011; CIfA 2014c; SMA 1995).

9.2.2 All archive elements will be marked with the **site/accession code**, and a full index will be prepared. The physical archive currently comprises the following:

- 1 cardboard boxes or airtight plastic boxes of artefacts and ecofacts, ordered by material type
- 1 files/document cases of paper records and A3/A4 graphics

Digital archive

9.2.3 The digital archive generated by the project, which comprises born-digital data (e.g., site records, survey data, databases and spreadsheets, photographs and reports), will be

Documentary records

9.4.2 Paper records comprise site registers (other pro-forma site records are digital), drawings and reports (Written Scheme of Investigation, client report). All will be retained and deposited with the project archive.

Digital data

9.4.3 The digital data comprise site records (tablet-recorded on site) in spreadsheet format; finds records in spreadsheet format; survey data; photographs; reports. All will be deposited, although site photographs will be subject to selection to eliminate poor quality and duplicated images, and any others not considered directly relevant to the archaeology of the site.

9.5 Security copy

9.5.1 In line with current best practice (e.g., Brown 2011), on completion of the project a security copy of the written records will be prepared, in the form of a digital PDF/A file. PDF/A is an ISO-standardised version of the Portable Document Format (PDF) designed for the digital preservation of electronic documents through omission of features ill-suited to long-term archiving.

9.6 OASIS

9.6.1 An OASIS (online access to the index of archaeological investigations) record (http://oasis.ac.uk) has been initiated, with key fields completed (Appendix 4). A .pdf version of the final report will be submitted following approval by the AA to CBC on behalf of the LPA. Subject to any contractual requirements on confidentiality, copies of the OASIS record will be integrated into the relevant local and national records and published through the Archaeology Data Service (ADS) ArchSearch catalogue.

10 COPYRIGHT

10.1 Archive and report copyright

10.1.1 The full copyright of the written/illustrative/digital archive relating to the project will be retained by Wessex Archaeology under the *Copyright, Designs and Patents Act 1988* with all rights reserved. The client will be licenced to use each report for the purposes that it was produced in relation to the project as described in the specification. The museum, however, will be granted an exclusive licence for the use of the archive for educational purposes, including academic research, providing that such use conforms to the *Copyright and Related Rights Regulations 2003*.

10.1.2 Information relating to the project will be deposited with the HER where it can be freely copied without reference to Wessex Archaeology for the purposes of archaeological research or development control within the planning process.

10.2 Third party data copyright

10.2.1 This document and the project archive may contain material that is non-Wessex Archaeology copyright (e.g., Ordnance Survey, British Geological Survey, Crown Copyright), or the intellectual property of third parties, which Wessex Archaeology are able to provide for limited reproduction under the terms of our own copyright licences, but for which copyright itself is non-transferable by Wessex Archaeology. Users remain bound by the conditions of the *Copyright, Designs and Patents Act 1988* with regard to multiple copying and electronic dissemination of such material

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APPENDICES

Appendix 1 Environmental Data

Table 1: Assessment of the environmental evidence

Feature Type	Feature	Context	Sample	Sample Vol. (l)	Flot vol. (ml)	Bioturbation proxies	Grain	Chaff	Cereal Notes	Other Plant Remains	Other Plant Remain Notes	Charcoal >2mm (ml)	Charcoal type	Other	Analysis: Potential	Analysis: Recommendations
Pit	3304	3305	263800_1	40	1600	10%	-	-	-	-	-	1400	*Quercus* sp., *Quercus/Castanea* – mainly mature stw/hw	-	C, C14	C14
Pit	3307	3308	263800_2	20	500	10%	-	-	-	-	-	300	*Quercus* sp., *Quercus/Castanea* – mainly mature stw/hw	-	C, C14	-
Pit	3309	3310	263800_3	30	1100	25%	-	-	-	-	-	1000	*Quercus* sp., *Quercus/Castanea* – mainly mature stw/hw	-	C, C14	
Pit	3316	3317	263800_4	10	1000	10%	-	-	-	-	-	800	*Quercus* sp., *Quercus/Castanea* – mainly mature stw/hw	-	C, C14	-

Appendix 2 Selection Strategy

Table 2: Selection strategy

3 MATERIALS			
Material Type:	Environmental material	**Page**	3.2
Stakeholders	Wessex Archaeology Environmental Manager Wessex Archaeology Archive Manager, Project Manager Colchester Museum curator Colchester Borough Council		
SELECTION STRATEGY			
Processing strategy: All environmental sampling has been undertaken Wessex Archaeology's in-house guidance, which adheres to the principles outlined in Historic England's guidance (English Heritage 2011 and Historic England 2015a) and as stated in the relevant WSIs (Wessex Archaeology 2022a). All environmental samples collected and suitable to address project aims and research objectives, as deemed by Wessex Archaeology's Environmental team, have been processed and assessed.			
Environmental material type	**Selection strategy**		
Unsorted residues	Residues were discarded after sorting		
Assessed flots and extracted materials.	Retain all samples		
DE-SELECTED MATERIAL			
De-selected material and finds from samples will be responsibly disposed of after processing and post-ex recording.			
AMENDMENTS			
Amendments to the selection strategy for environmental material will be agreed with Stakeholders prior to implementation and recorded in the project archive.			

Appendix 3 OASIS summary

Summary for wessexar1-507972

OASIS ID (UID)	wessexar1-507972
Project Name	Excavation at Layer de la Haye WTW Enhancement, Layer de la Haye, Essex
Sitename	Layer de la Haye WTW Enhancement, Layer de la Haye, Essex
Activity type	Excavation
Project Identifier(s)	263800
Planning Id	
Reason For Investigation	Planning: Pre application
Organisation Responsible for work	Wessex Archaeology
Project Dates	13-Jun-2022 - 04-Jul-2022
Location	Layer de la Haye WTW Enhancement, Layer de la Haye, Essex NGR : TL 96482 19805 LL : 51.8422665808221, 0.850836216035043 12 Fig : 596482,219805
Administrative Areas	Country : England County : Essex District : Colchester Parish : Layer-de-la-Haye
Project Methodology	Wessex Archaeology was commissioned by Stantec UK to conduct a strip, map and sample excavation covering 1.3 hectares adjacent to Layer de la Haye Water Treatment Works as part of a programme of archaeological mitigation prior to submission of a planning application to improve the existing facilities. The excavation, centred on NGR 596482 219805, is part of a series of archaeological investigations within the site which have included a desk-based assessment, and an archaeological trial trench evaluation. An archaeological watching brief is planned for future works but will be reported on separately. The former investigations were conducted over a considerable timeframe, with the evaluation being undertaken in 2005, and the desk-based assessment in 2022. The trial trench evaluation highlighted two foci of archaeological interest within the proposed red line boundary for the site. The site has been divided up into three areas, all works discussed within this report pertain to Area C. The foci were located in the north-west corner in the vicinity of a previously recorded crop mark and the south-west corner of Area C, this excavation was located on the eastern and central portion of Area C. The previously recorded archaeological remains dated from the Neolithic period through to the post-medieval period. The evaluation recorded sherds of Neolithic pottery from a single pit, a series of late Iron Age features, including three cremation burials, pits and ditches, 13th century field enclosures and post-medieval ditches and a possible trackway. However, this excavation only revealed six small pits whereby four of them were sampled for environmental assessment. The features sampled were identified as the truncated remains of charcoal production pits variously (and poorly) dated between the Iron Age, Romano-British and medieval periods. Further radiocarbon dating of two single entity samples from pit 3304 would be able to establish the accurate date of the assessed pits. The excavation was undertaken between the 13th June and the 4th July 2022.
Project Results	A total of six small, undated pits were recorded across the 1.3 ha SMS.
Keywords	Pit - UNCERTAIN - FISH Thesaurus of Monument Types

Funder	
HER	Colchester Borough Council - unRev - STANDARD
Person Responsible for work	Rachel, Williams
HER Identifiers	HER Event No - ECC4710
Archives	Physical Archive, Documentary Archive, Digital Archive - to be deposited with Colchester & Ipswich Museum Sevice (Colchester Collection);

596100

597100

219750

Layer-de-la-Haye

Birch Road

Malting Green Road

B1026

0 200 m

Site
Area A
Area B
Area C
Evaluation trench (2005)
SMS area (2022)

Essex
Site

Layer-de-la-Haye
Malting Green
Site
Roman River

Coordinate system: OSGB36

Date:	21/07/2022	Revision Number:	0
Scale:	1:5000 at A3 (main graphic)	Illustrator:	CM
Path:	R:\PROJECTS\263800\Graphics_Office\Rep figs\PXA\2022_07_21		

Site location

Figure 1

Coordinate system: OSGB36

Date:	22/07/2022	Revision Number:	0
Scale:	1:1250 at A3	Illustrator:	CM
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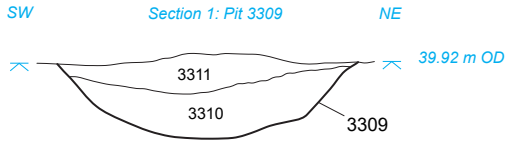
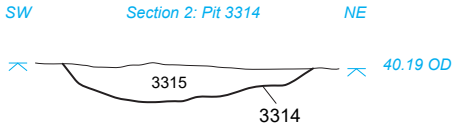
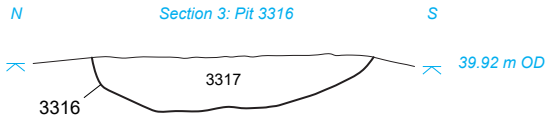
Archaeological results

Figure 2







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Scale:	1:20 at A4	Illustrator:	CM
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Sections

Figure 3

Figure 4: Pit 3309 viewed from the south-east. Scale is 0.5 m

Figure 5: Pit 3314 viewed from the south-east. Scale is 0.5 m

Date:	25/07/2022	Revision Number:	0
Scale:	Not to scale	Illustrator:	CM
Path:	R:\PROJECTS\263800\Graphics_Office\Rep figs\PXA\2022_07_21		

Figure 6: Pit 3316 viewed from the west. Scale is 0.5 m

Date:	25/07/2022	Revision Number:	0
Scale:	Not to scale	Illustrator:	CM
Path:	R:\PROJECTS\263800\Graphics_Office\Rep figs\PXA\2022_07_21		

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