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Former Perkins Engines Site, Newark Road, Fengate, Peterborough

Archaeological Evaluation Report

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Summary

Between 16th and 23rd January 2018 Oxford Archaeology East (OAE) carried out a trenched evaluation on the former Perkins Engines Site, Newark Road, Fengate, Peterborough (TF 2138 0030; Fig. 1). The land that encompasses the proposed residential and commercial development was c.4.4 ha of scrubland extending to the east of the current Perkins Engines factory. A geophysical survey of the proposed development was carried out by Magnitude Surveys (Harris 2017) which found the area was heavily disturbed and showed no clear geophysical anomalies. Therefore, the evaluation comprised the excavation of twenty 50m x 2m trenches laid out on a standard grid.

Archaeological remains were revealed within the southern half of the development area, with evidence for a rectilinear field system on a north-east to south-west/north-west to south-east axis being uncovered. A single pit was also found which contained the cremated remains of one individual within the lower backfill. Another field system on a more north to south/east to west axis was also recorded in three trenches.

Within the northern half of the development area evidence was sparser, with occasional shallow ditches on a similar alignment to those in the south, two postholes and a number of tree throws being uncovered. Significant modern truncation and contamination was found within the central belt of trenches, which had impacted upon the archaeological horizon.

The dating of many of these features is difficult, due to the lack of datable artefacts within them. The main rectilinear field system is similar in its alignment with the known Middle Bronze Age field system within the local landscape, and the cremation probably dates to the same period. Ditches relating to the other field system are also poorly dated, but are most probably Romano-British in origin.



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The project was managed for Oxford Archaeology by Matthew Brudenell. The fieldwork was directed by the author and Graeme Clarke, who were supported by Peter Dearlove, Matthew Edwards and Sarita Louzolo, who also undertook survey and digitising. Thank you to the teams of OA staff that cleaned and packaged the finds and processed the environmental remains.



1 INTRODUCTION

1.1 Scope of work

- 1.1.1 Oxford Archaeology East (OAE) was commissioned by Cross Keys Homes Ltd to undertake a trial trench evaluation at the site of the former Perkins Engines Site, Newark Road, Fengate, Peterborough. (TF 2138 0030; Fig. 1).
- 1.1.2 A Heritage Impact Assessment was undertaken for the site in 2017 by KDK Archaeology Ltd that indicated a high archaeological potential for prehistoric remains within the development area (Shlasko 2017). A geophysical survey of the site was carried out by Magnitude Surveys (Harris 2017, Appendix E) which found the area was heavily disturbed and showed no clear geophysical anomalies. Other recent archaeological fieldwork has also been undertaken nearby in respect to previous redevelopment of surrounding land (Rees 2014, Nicholson 2012; Fig. 2) which has found evidence for archaeological features spanning the prehistoric period.
- 1.1.3 The work was undertaken to inform the Planning Authority in advance of a submission of a Planning Application (planning ref. PAMAJ/17/00111 and PAMAJ/17/00112). A brief was set by Rebecca Casa-Hatton of Peterborough City Council Archaeological Service (PCC/AS) outlining the Local Authority's requirements for work necessary to inform the planning process. A written scheme of investigation was produced by OA detailing the methods by which OA proposed to meet the requirements of the brief (Wiseman 2017).

1.2 Location, topography and geology

- 1.2.1 The site is located within the urban reach of Peterborough, *c*. 2km east of the River Nene (Fig. 1). The site covers *c*. 4.4ha on a level area of grass covered land with some areas of scrub and tarmac at approximately 4.5m OD. The site is bounded by roads and light industrial units and car parks to the south and west, with residential development along Newark Road to the east, and Marriott Court to the north.
- 1.2.2 The underlying bedrock geology of the site comprises the Kellaway Clay Member mudstone with no superficial deposits shown to be present (www.bgs.ac.uk/ discoveringGeology/geologyOfBritain/viewer.html, accessed 25th January 2018). Upon excavation of the trenches, superficial deposits of terrace gravel deposits were recorded across the development area, forming the geology that archaeological features cut.

1.3 Archaeological and historical background

1.3.1 The archaeological and historical background of the site is discussed in the desk-based assessment (Schasko 2017) and a summary of this is found below.

Prehistoric

1.3.2 Early prehistoric finds from the area include Mesolithic and Neolithic artefacts (PCHER 2977; 51198 and 51199) as well as Neolithic and Early Bronze Age features (mostly in the form of tree throws containing small assemblages of pottery and flint). Early

Bronze Age barrow sites are well attested to within the locality, with three examples being located within 400m east of the subjects site (HERs 3002, 3111, 50420).

- 1.3.3 The vast majority of known heritage assets within the area are of Bronze Age date (Fig. 2). The surrounding landscape during this period was a patchwork of field system ditches, trackways, rectilinear enclosures and associated settlement features comprising pits, postholes and watering holes. The nationally significant Flag Fen site is located 2km south-east of the subject site, where a timber causeway and associated structures were preserved by the formation of peat during the 2nd millennium BC (Pryor 2001).
- 1.3.4 The Middle Bronze Age activity is evident in other recent archaeological works undertaken in the vicinity: immediately south of the subject site, excavations at The Broadlands (HER51246; Nicholson 2012) revealed evidence for the extensive Fengate Bronze Age field system, known to extend down to the adjacent fen-edge east of the site. Further south from this excavation, on the former Perkins Engine Site (south) evaluation and excavation (HER54005; Rees 2014) also found evidence for this field system. At the Broadlands site, a second set of ditches forming an enclosure on a different alignment to the Middle Bronze Age field system was phased to the Late Bronze Age/Early Iron Age.
- 1.3.5 Other Late Bronze Age/ Early Iron Age activity in the vicinity includes Iron Age settlement and early Iron Age cremations located 1km south-west of the subject site (Hawkes & Fell 1945).

Roman, Post-Roman and Modern Activity

- 1.3.6 Romano-British settlement is attested to within the vicinity by findspots located 300-500m north-west of the development area (Fig. 2) and the scheduled monument Car Dyke is located approximately 600m to the west (SM35725).
- 1.3.7 During the Late Roman/Early Post-Roman period a layer of plough soil was identified at the Broadlands site, which sealed the earlier phases. Post-medieval and modern pits and ditches cut this earlier soil.
- 1.3.8 Cartographic evidence suggests the surrounding area was part of the open fields of Newark, a small hamlet during the medieval period located 400m north of the site. The 1821 Enclosure map shows the site divided into four plots, one of which was a gravel pit in the east along Newark Road. By the time the 1889 Ordnance Survey map was produced, the area was divided into two fields. By 1971 the area was part of sports facilities owned by Perkins Engines which included tennis courts, a pavilion and parking area and a range of other buildings. By the end of the 20th century the original pavilion was demolished and a new, larger, pavilion built. By 2008 the Sports Association closed and the buildings were subsequently demolished.

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2 EVALUATION AIMS AND METHODOLOGY

2.1 Aims

- 2.1.1 The project aims and objectives were as follows:
 - i. To determine or confirm the general nature of any remains present.
 - ii. To determine or confirm the approximate date or date range of any remains, by means of artefactual or other evidence.
 - iii. Assess the impact of modern truncation on any surviving archaeological remains
 - iv. To provide sufficient information to construct an archaeological mitigation strategy, dealing with the preservation and recording of any features found.

2.2 Methodology

- 2.2.1 A total of 20 x 50m long trenches were excavated in a grid pattern across the development area. None were targeting geophysical anomalies, due to the poor results of the survey.
- 2.2.2 All trenches were opened by an 18 tonne 360-type tracked excavator, to a depth where the horizon of either archaeological deposits or geology was reached. In certain trenches, significant modern truncation and contamination was encountered; when this was found excavation was stopped if geology was not reached after a depth of 1.2m.
- 2.2.3 All archaeological features were hand excavated, drawn and photographed by professional archaeologists and all finds retained unless identified as being modern in date. Metal detecting was undertaken across the excavated material and bucket sampling (90 litres of soil) was also undertaken to quantify any archaeological objects found within the topsoil and subsoil. This was not undertaken on trenches which were found to contain modern and/or contaminated material.
- 2.2.4 Environmental samples were taken for flotation processing to look for any charred or mineralised ecofacts (plant remains). These samples were taken from most features to evaluate their ecofactual potential. Any features seen to have a high charcoal content during excavation were also sampled.
- 2.2.5 Archaeological features and excavated slots were recorded was using a Lecia GS08 GPS with Smartnet capabilities.



3 **RESULTS**

3.1 Introduction and presentation of results

- 3.1.1 The results of the evaluation are presented below by trench number; trenches that were found to contain archaeological remains are described, including a stratigraphic description of the remains. Trenches containing no archaeological remains, or those which were impacted by significant modern truncation are not described. The full details of all trenches with dimensions and depths of all deposits can be found in Appendix A.
- 3.1.2 All trenches were 50m long, 2m wide and on a north-north-west to south-south-east or east-north-east to west-south-west alignment in a grid pattern to ensure best coverage of the development area. Trench alignments are detailed in Appendix A and can be seen on Fig. 2.

3.2 General soils and ground conditions

- 3.2.1 The soil sequence between trenches in the southern half of the subject site was fairly uniform. The natural geology of sands and gravels was overlain by a sandy clay subsoil (*c*. 0.3m), which in turn was overlain by loamy topsoil (*c*. 0.3m). However, the sequence within the northern half of the area was variable. The more central trenches (7, 8, 9, 11 and 13) were all found to be heavily contaminated with diesel and significant modern overburden had developed over the original ground level (Plate 1), with the four trenches being found to be at least 1.2m in depth before encountering clean, natural geology. Similarly, significant modern truncation has occurred in many of the trenches, with the original level of the natural geology being disturbed by the construction of previous buildings within the area. The northern-most trenches (1 to 6) were also found to have modern overburden overlying the original ground level, although no contamination was found, with natural geology encountered at approximately 0.8m to 1.2m below current ground level. Full depths of overburden within each trench can be found in Appendix A.
- 3.2.2 Ground conditions throughout the evaluation were generally good, with free draining geology within the majority of trenches. The exception to this were the trenches located within the footprint of previous modern structures; where the significant ground contamination in the form of diesel was noted and standing water stayed within the trenches after rainfall.
- 3.2.3 Where the geology had not been disturbed by later activity, archaeological features, where present, were easy to identify against the underlying geology of sands and gravels.

3.3 Bucket Sampling & Metal Detecting

3.3.1 The results of the bucket sampling were extremely poor. No finds of archaeological interest were recovered from the trenches it was undertaken on (all apart from those disturbed by modern truncation), with only occasional modern ceramics and ironwork being recovered and subsequently discarded on-site.



3.3.2 Similarly, metal detecting the excavated spoil and trenches resulted in no finds of archaeological interest. The significant amounts of modern material within the overburden also hampered the metal detecting.

3.4 General distribution of archaeological deposits

- 3.4.1 Archaeological features were present in 12 trenches (3, 4, 5, 6, 10, 12, 14, 15 & 17 to 19). Trench 2 contained two undated tree throws, whilst the remaining trenches were either devoid of archaeology (Trenches 1, 16 & 20) or the modern truncation/contamination had severely impacted what would have been the archaeological horizon (Fig. 3: Trenches 7, 8, 9, 11 & 13). Trenches 12 and 15 also had some form of modern truncation or contamination within parts of the trench (Plate 2).
- 3.4.2 Generally, the results suggest two phases of rectilinear field system within the southern half of the development area and a small amount of similar activity surviving within the north-east corner, whilst modern activity has significantly impacted the archaeological horizon within the central band of the development area.

3.5 Northern Archaeological Activity

3.5.1 Activity within the northern-most trenches was sparse (Fig. 4), seen in the form of a number of shallow ditches, a pair of postholes and a few tree throws. As previously stated, Trench 1 contained no archaeological features and trenches 7, 8 and 9 were heavily truncated and contaminated with diesel, although two ditches did survive within the contaminated ground in Trench 7.

Trench 2

3.5.2 Located near the northern boundary of the area, natural geology was found at a depth of 0.9m, overlain by 0.4m of subsoil and 0.5m of topsoil. No features of archaeological interest were found within the trench, although two undated tree throw features were recorded in the eastern third of the trench, one of which was truncated by a modern drain. No finds were recovered from either feature.

Trench 3

3.5.3 East of Trench 2, natural geology was found at a depth of 0.6m within this trench, overlain by 0.3m of subsoil and 0.3m of topsoil. A single possible ditch terminus (23) was recorded within the trench on a north-east to south-west alignment and measuring 0.95m wide, 0.27m deep, with a wide U-shaped profile. The mid brownish grey silty clay fill (24) contained moderate gravel inclusions and no finds although a single charred seed of knotgrass was recovered from the environmental sample. It is possible this ditch may in fact represent the remains of a tree throw extending beyond the trench due to its quite irregular shape in plan.

Trench 4

3.5.4 Parallel to and east of Trench 3, natural geology was found at a depth between 0.8m and 1.2m within this trench, overlain by 0.4m of subsoil and between 0.4m to 0.8m of made ground consisting of gravel, concrete, brick and topsoil. A north-east to south-



west aligned ditch terminus (29) and two postholes (25 & 27) were revealed along with a modern ditch and concrete lined drain.

- 3.5.5 Located at the northern end of the trench, the boundary ditch terminus (29) was 0.85m wide, 0.22m deep with a wide U-shaped profile, infilled with a mid brownish grey silty clay (30) that contained rare gravel and flint inclusions. No finds were recovered.
- 3.5.6 Towards the central southern end of the trench, postholes **25** and **27** may be suggestive of a structure within the vicinity. Postholes **25** was the southern-most of the two and measured 0.49m in diameter and 0.12m deep with a U-shaped profile. The backfill (27) was a mid brownish grey silty clay that contained rare charcoal inclusions. Posthole **27** was slightly larger at 0.68m diameter and 0.25m depth. The backfill (28) was a mid brownish grey silty clay that contained rare charcoal inclusions. No finds were recovered from either feature.
- 3.5.7 The modern ditch and concrete drain were located within the centre of the trench. Willow pattern pottery fragments were noted within the upper fill of the ditch.

Trench 5

3.5.8 Near to the north-west corner of the site, south of Trench 1, this trench was found to contain a single ditch (10). The natural geology was uncovered at a depth of 0.8m, overlain by 0.4m of subsoil and 0.4m of topsoil. The ditch (10, Fig. 6, S.1) was 0.52m wide and 0.3m deep with a U-shaped profile, infilled with a mid brownish grey silty clay that contained rare charcoal inclusions (11). Again, no finds were recovered and the sample contained no preserved ecofacts.

Trench 6

- 3.5.9 To the east of Trench 5, the natural geology was uncovered at a depth of 0.8m within this trench, overlain by 0.3m of subsoil and 0.5m of made ground consisting of gravels, concrete and brick. Two undated ditch terminals were recorded along with two tree throws.
- 3.5.10 Within the centre of the trench, the two tree throws were irregularly shaped in plan, 0.6m to 1.05m in diameter and 0.12m to 0.23m deep. No finds were found within their brown silty clay fills.
- 3.5.11 At the western end of the trench, ditch terminus **12** (Fig. 6, S.2) was on a north-west to south-east alignment and measured 0.44m wide and 0.12m deep with a wide U-shaped profile. The secondary fill was a mid greyish brown clayey silt with rare gravel inclusions. No finds were recovered.
- 3.5.12 To the east, on the same alignment as the previous feature, ditch terminus 14 (Fig. 6, S.3) was 0.35m wide and 0.18m deep with a U-shaped profile, infilled with a mid greyish brown clayey silt that contained occasional gravel inclusions and no finds.

Trench 7

3.5.13 Within the contaminated 'belt' in the central trenches, this western trench was dug to a depth of 0.9m, at which depth natural geology was met, although it was heavily

contaminated with diesel. This geology was overlain by 0.4m of contaminated subsoil and 0.5m of made ground consisting of hardcore, concrete and brick. Two ditches were uncovered within the trench, one on a north-east to south-west alignment and the other north-west to south-east. Neither were excavated due to the contamination.

3.6 Southern Archaeological Activity

- 3.6.1 There was less impact from modern development activity within the southern half of the area (Fig. 5), which had been left as a cricket pitch during the modern period. Because of this, in most of the trenches, the geology was sealed by a layer of subsoil 0.3m to 0.4m thick, in turn overlain by poor quality topsoil 0.3m to 0.4m thick, unless otherwise stated in the trench descriptions.
- 3.6.2 Archaeological remains were more common within the southern half of the development area, possibly due to this lack of a modern impact on the archaeological horizon. Several boundary ditches on a north-east to south-west/north-west to south-east axis were revealed, along with a further system of boundaries on a north to south/east to west axis. The most significant feature recorded was that of a large cremation pit within Trench 14, which contained the cremated remains of a single individual in its lower backfill.
- 3.6.3 Within this southern half of the development area, Trenches 16 and 20 were devoid of archaeology, Trenches 11 and 13 were heavily disturbed by modern activity and Trenches 10, 12, 14, 15, 17, 18 & 19 contained archaeological features.

Trench 10

3.6.4 East of the subject sites western boundary, and north of Trench 14, this trench (Plate 3) was found to contain a single ditch at its southern-most end, on a north-east to south-west alignment. This ditch (21; Fig. 6, S.5) measured 1.04m wide and 0.28m deep with a wide-U-shaped profile. The mid brownish grey silty clay secondary fill (22) contained occasional charcoal and gravel inclusions.

Trench 12

- 3.6.5 West of, and parallel with, the development area's eastern boundary, this trench contained a single ditch on a north-east to south-west alignment. It's northern-most 10m was also impacted by modern truncation, which was at least 1m deep.
- 3.6.6 The north-east to south-west aligned ditch (33) measured 1.55m wide and 0.57m deep with a U-shaped profile. The sole fill (34) consisted of a mid to dark greyish brown silty clay, the lower horizon of which contained moderate gravel inclusions. No finds were recovered.

Trench 14

3.6.7 South of Trench 10, this trench contained three ditches and a single, large, cremation pit. Two of the ditches (49 & 52) were on a north-west to south-east alignment whilst the third (19) was aligned north to south.



- 3.6.8 Located at the western end of the trench, cremation pit **16** (Fig. 6, S.4, Plate 4) measured 0.88m wide and 0.3m deep, with a flat base and near vertical sides. The lower backfill (17) consisted of a very dark bluish grey clayey silt that contained common charcoal and moderate cremated bone inclusions. Upon 100% excavation of the feature, 200g of cremated human skeletal remains were found to be slumped into the pit on its eastern edge, part of backfill 17. The environmental sample recovered cremated bone along with a single charred dock seed. The upper backfill (18) consisted of a 0.2m thick mid yellowish brown silty clay with occasional charcoal inclusions. Three fragments of pottery weighing less than 1g were recovered from the upper backfill.
- 3.6.9 To the east, north to south ditch **19** was 0.95m wide, 022m deep with a wide U-shaped profile and rooting on its western edge may have been suggestive of a hedgerow. The sole fill (20) was a light brownish grey silty clay with rare charcoal inclusions. A single sherd of Romano-British pottery (mid-1st to 2nd century AD) was found in the fill.
- 3.6.10 Further east, ditch **49** (Fig. 6, S.8, Plate 5) measured 1.44m wide and 0.6m deep with a wide U-shaped profile. The lower fill slumped in on the ditches eastern edge, consisting of a 0.3m thick mid yellowish brown sandy clay (50), suggestive of bank material. Overlying this was a mid brownish grey sandy clay, 0.5m thick, with occasional charcoal inclusions (51). A large fragment of a fired clay cylindrical loom weight (SF1) and a single cattle bone were recovered from the feature (fill 51), whilst the environmental sample was sterile.
- 3.6.11 Again, to the east, ditch **52** (Fig. 7, S.9) measured 1.7m wide and 0.54m deep with a wide U-shaped profile. The lower fill (53) consisted of a 0.21m thick slump of mid brownish grey clayey silt with occasional gravel inclusions. This was overlain by a dark yellowish brown silty sand with common gravel inclusions (54), 0.22m thick which was in turn overlain by a mid greyish brown silty clay with rare gravel inclusions (55). No finds were recovered from any of the fills and, again, the environmental sample was sterile.

Trench15

3.6.12 East of Trench 14, a single north-east to south-west aligned ditch was recorded in the centre of this trench (**35**). This ditch measured 1.1m wide and 0.4m deep with a U-shaped profile and was infilled with a mid greyish brown silty clay (36) which contained occasional gravel inclusions. No finds were recovered from the feature.

Trench17

3.6.13 In the south-western corner of the development area, this trench contained two ditches (Plate 6) near its southern end. The north-east to south-west aligned ditch (31; Fig. 6, S.6) measured 0.8m wide and 0.14m deep with a wide, shallow, U-shaped profile. The sole fill (32) was a mid brownish grey silty clay with frequent gravel inclusions and occasional charcoal. Perpendicular to this ditch, and only just within the trench, ditch terminus 47 measured at least 0.48m wide and 0.31m deep with a U-shaped profile, infilled with a dark brownish grey silty clay with occasional charcoal



inclusions. No relationship could be seen between the two features and no finds or ecofacts were recovered from either.

Trench 18

- 3.6.14 East of Trench 17, this trench contained four ditches; two on a north-east to southwest alignment (**39** & **45**) and two aligned east to west (**41** & **42**).
- 3.6.15 The southern-most ditch terminus (**39**; Fig. 6, S.7) measured 0.62m wide and 0.33m deep with a U-shaped profile and terminated within the trench. Its sole fill (40) was a dark brownish grey silty clay with occasional gravel inclusions and no finds.
- 3.6.16 To the north was a pair of parallel ditches (41 & 43; Fig. 7, S.10). The southerly of the two (41) measured 0.58m wide and 0.24m deep with a U-shaped profile, infilled with a mid greyish brown clayey silt with occasional gravel inclusions (42). Directly north, ditch 43 measured 0.68m wide and 0.24m deep with a U-shaped profile, infilled with a dark greyish brown clayey silt that contained occasional gravel inclusions. Again, both features contained no finds.
- 3.6.17 The final and northern-most ditch (45; Fig. 7, S. 11) was 0.92m wide and 0.34m deep with a U-shaped profile. Its sole fill consisted of a light greyish brown clayey silt with rare gravel inclusions and no finds.

Trench 19

3.6.18 Finally, Trench 19 was located east of Trench 18 and south of Trench 15 and contained a single ditch terminus on a north-west to south-east alignment (**37**) near the trenches western end. The ditch measured 1.1m wide and 0.33m deep with a U-shaped profile, infilled with a dark brownish grey silty clay (38) with rare charcoal inclusions and no finds or preserved ecofacts.

3.7 Finds and Environmental summary

- 3.7.1 Finds were sparse, with only one cattle bone and a 365g fragment of a fired clay loom weight (SF1) from ditch **49** and a single sherd of Romano-British pottery from ditch **19**, both located in Trench 14. Also in Trench 14, 200g of cremated bone and 3 fragments of highly fragmented pottery were recovered from cremation pit **16**.
- 3.7.2 Metal detecting of the excavated trenches and features recovered no finds of archaeological interest, with numerous modern iron objects often being found, and thus discarded.
- 3.7.3 Environmental remains were similarly sparse, with a single charred seed of knotgrass being recovered from one sample (sample 3, Ditch 23, Trench 3) and a single preserved dock seed along with charcoal and cremated human remains was found within the sample taken from cremation 16 (sample 2, Trench 14). All other samples were sterile.



4 **DISCUSSION**

4.1 Reliability of field investigation

4.1.1 The results of the evaluation are reliable, with the archaeological features being clearly visible within the trenches, and the terrace gravel geology meant that the geological horizon was clearly apparent when encountered. The trenches containing modern truncation and diesel contamination may have masked or truncated away any features that were within these trenches however.

4.2 Evaluation objectives and results

- 4.2.1 The aims of the evaluation have been achieved, identifying the presence of surviving heritage assets within the southern and north-eastern parts of the development area. The lack of dating evidence from most features is problematic, as it doesn't allow for a clear narrative of past land use to be confirmed, although some of the features alignments would certainly suggest they relate to known archaeological features within the local landscape previously identified as Middle Bronze Age in date.
- 4.2.2 Furthermore, the evaluation has uncovered significant modern truncation within the central 'belt' of the development area. Other areas of modern impact were also noted within Trenches 11, 12 and 15, although not as significant. Diesel contamination was also evident within these areas of modern impact (Fig. 3), some of which had affected archaeological features (such as the ditches in Trench 7).

4.3 Interpretation

4.3.1 Generally, the results of the evaluation have identified two phases of rectilinear field system, one on a north-west to south-east/north-east to south-west axis, and the second on a more north to south/east to west axis. Despite a lack of dating evidence, these field systems can be tentatively dated due to findings of previous archaeological works within the area. The first rectilinear field system is on a comparable alignment to the Middle Bronze Age system identified directly to the south of the development area, on the Broadlands site. The more east to west system is most probably part of a wider field system set out during the Romano-British period. No evidence of activity during the post-Roman period was revealed.

Middle Bronze Age

- 4.3.2 The Middle Bronze Age activity within the development area is suggestive of a large rectilinear field system, evidence for which has been found on other archaeological excavations within the vicinity, as previously mentioned. The best examples of the field system ditches were recorded in trenches in the south-western corner of the development area, particularly the two ditches in Trench 14 (49 and 52) which survived to a good depth.
- 4.3.3 Often, the field system is found alongside other features relating to pastoral farming, such as water holes, and often evidence for settlement is also found. The field system located directly to the south was found alongside water holes and structural remains (Nicholson 2012). The water holes were regionally significant, with preserved log

ladders surviving within the two large features; it is possible these more discrete features were missed by the trenching and could be within the development area.

- 4.3.4 On a similar note, the recovery of a large fragment of a clearly Middle Bronze Age cylindrical loom weight from ditch **49** is suggestive of a settlement in the close vicinity during the period. The fragment was large and relatively unabraded, suggesting limited residuality prior to deposition. Interestingly, the object bears a striking similarity to the complete cylindrical loom weight recovered from the recent evaluation at Leeds Farm, Norwood (2.6km north of this site). This evaluation was also on the fen edge and found evidence for further Middle Bronze Age field systems and settlement (Collie 2017).
- 4.3.5 The orientation of the ditches suggests the alignment has altered a fair degree from that seen to the south (Fig. 2 & Evans 2009, Fig. 6.1), and could indicate the layout of the fields followed the contours of the fen-edge. Topographically, the fen-edge curves eastwards to the north-east of the development area, with Flag Fen being located within the lower land to the south and east (the Flag Fen causeway post alignments are located *c*.1.8km south-east of the development area).
- 4.3.6 The single large pit containing a cremation, located within in Trench 14, is of significance; the size of the feature was relatively large for a cremation pit, and its form was more suggestive of a storage pit. The cremation has been phased to the Middle Bronze Age period, although a Late Bronze Age or Early Iron Age date is also plausible. Human remains are found occasionally within the local landscape, with a Late Bronze Age crouched burial excavated during the Broadlands excavation directly to the south (Nicholson 2012), and Late Bronze Age/ Early Iron Age cremations being found 1km to the south-west during gravel extraction (Hawkes & Fell 1945). Similarly, the close location of three HER entries of Bronze Age barrows (directly east of the development area, Fig. 2) would indicate the area clearly held a significant importance to the local Bronze Age communities and it is probable further cremations may be found within the development area.

Romano-British

4.3.7 The more regular north to south/east to west axis field system (located in Trenches 12, 14 & 18: ditches 33, 19, 41 & 43) has been tentatively dated to the early Romano-British period, due to the retrieval of a single sherd of pottery that dates to the mid-1st to 2nd Century AD. Their alignment, profile and fills were markedly different to the Middle Bronze Age field system, with much shallower profiles and more humic infilling. Early Roman activity is known in the vicinity, with Roman pottery, brick and tile recorded in three HER entries 3-500m to the north-west (Fig. 2), and the fen-edge is known to have been a prolific area for Romano-British farmsteads and settlements (Evans 2013). These ditches most probably represent the outlying field system relating to one of these fen-edge settlements, located on slightly higher ground (c. 12mOD) to the north-west.



Post-Roman

- 4.3.8 No significant post-Roman activity was identified within the development area; no surviving medieval/post-medieval plough soil previously identified during the works undertaken on Broadlands, to the south (Fig. 2, Nicholson 2012) was recorded, although it is still most probable the area was part of the wider open field system relating to the nearby hamlet of Newark during the period.
- 4.3.9 Evidence for the early modern gravel pit seen on OS 1st edition mapping may have been identified within Trench 11, where a large pit was located within the majority of the trench and was at least 1.7m deep. During the modern period, the area was clearly impacted by the construction of the pavilion and associated services and significant diesel contamination occurred at some point during this time.

4.4 Conclusion

4.4.1 This evaluation has uncovered evidence for a Middle Bronze Age field system and parts of a later, probably Romano-British, field system. The surrounding area's prehistory is well investigated, with numerous archaeological interventions since the 1970s being undertaken, revealing a patchwork of Middle Bronze Age field systems, other agricultural features and settlement activity. The evidence from this evaluation extends the identified field system seen to the south within the Broadlands excavation, and provides further evidence for land management, slightly higher up away from the fen-edge.



APPENDIX A TRENCH DESCRIPTIONS AND CONTEXT INVENTORY

Trench 1								
General description Orientation ENE-WSW								
Trench de	evoid of a	rchaeolo	Length (m)	50				
and subso	oil (0.3m)	overlying	Width (m)	2				
			Avg. depth (m)	0.7				
Trench 2						÷		
General of	lescriptio	n			Orientation	ENE-WSW		
Trench co	ontained t	wo tree t	hrows ar	nd a modern drain. Consisted	Length (m)	50		
of topsoil	l (0.5m) a	Width (m)	2					
sandy gra	ivels.	Avg. depth (m)	0.9					
Trench 3								
General of	descriptio	n			Orientation	NNW-SSE		
Trench co	ntained o	ne possik	ole NE-SW	/ ditch terminus. Consisted of	Length (m)	50		
topsoil ar	nd subsoil	overlying	natural	geology of sandy gravels.	Width (m)	2		
					Avg. depth (m)	0.6		
Context	Туре	Width	Depth	Description	Finds	Date		
No.		(m)	(m)					
23	Cut	0.95	0.27	Ditch terminus	-	-		
24	Fill	-	0.27	Ditch terminus	-	-		
Trench 4	<u>.</u>					÷		
General of	lescriptio	n			Orientation	NNW-SSE		
Trench co	ontained a	a NE-SW d	Length (m)	50				
ditches/d	rains also	o present	. Consist	ted of made ground (0.6m-	Width (m)	2		
0.8m) an	id subsoi	l (0.4m)	Avg. depth (m)	1				
gravels.								
Context	Туре	Width	Depth	Description	Finds	Date		
No.		(m)	(m)					
25	Cut	0.49	0.2	Posthole	-	-		
26	Fill	-	0.2	Posthole	-	-		
27	Cut	0.68	0.25	Posthole	-	-		
28	Fill	-	0.25	Posthole	-	-		
29	Cut	0.85	0.22	Ditch	-	-		
30	Fill	-	0.22	Ditch	-	-		
Trench 5								
General of	lescriptio	n			Orientation	NNW-SSE		
Trench co	ontained	one NE-S	W ditch.	Consisted of topsoil (0.4m)	Length (m)	50		
and subso	oil (0.4m)	overlying	natural	geology of sandy gravels.	Width (m)	2		
					Avg. depth (m)	0.8		
Context	Туре	Width	Depth	Description	Finds	Date		
No.		(m)	(m)					
10	Cut	0.52	0.3	Ditch	-	-		
11	Fill	-	0.3	Ditch	-	-		



Trench 6							
General c	lescription	า			Orientation	ENE-WSW	
Trench co	ontained 2	2 NE-SW	ditch te	rminals & two tree throws.	Length (m)	50	
Consisted	l of made	ground	(0.5m) a	ind subsoil (0.3m) overlying	Width (m)	2	
natural ge	eology of s	andy gra	vels.		Avg. depth (m)	0.8	
Context	Туре	Width	Depth	Description	Finds	Date	
No.		(m)	(m)	·			
12	Cut	0.44	0.12	Ditch	-	-	
13	Fill	-	0.12	Ditch	-	-	
14	Cut	0.35	0.18	Ditch	-	-	
15	Fill	-	0.18	Ditch	-	-	
Trench 7						1	
General c	lescription	Orientation	ENE-WSW				
Trench c	ontained	Lenath (m)	50				
unexcava	ted due to	o contam	ination o	f ground. Consisted of made	Width (m)	2	
ground (0.5m) and	l subsoil	(0.4m) d	overlying natural geology of	Ava. depth (m)	0.9	
sandy gra	vel. Entire	e trench v	vas conta	minated with diesel.			
Trench 8							
General o	lescription	1	Orientation	NNW-SSE			
Trench de	evoid of a	rchaeolo	gy. Consi	sted of made ground (1m+)	Length (m)	50	
overlying	natural g	eology o	f sandy (gravel. Diesel contamination	Width (m)	2	
was loca	ted throu	lghout t	he trend	ch and modern truncation	Avg. depth (m)	1	
backfilled	with hard	lcore was	s within t	he central 20m.	5 1 ()		
Context	Туре	Width	Depth	Description	Finds	Date	
No.		(m)	(m)				
Trench 9							
General c	lescription	Orientation	ENE-WSW				
Trench de	evoid of ar	chaeolog	y. Consis	ted of made ground (1.1m+)	Length (m)	50	
overlying	natural g	geology (of sandy	gravels. Entire trench was	Width (m)	2	
contamin	ated with	diesel.			Avg. depth (m)	0.7	
Trench 10	Trench 10						
General c	lescription	า			Orientation	NNW-SSE	
Trench co	ntained o	ne NE-SW	/ ditch. C	onsisted of topsoil (0.3-0.4m)	Length (m)	50	
and subso	oil (0.3-0.4	m) overly	ying natu	ral geology of sandy gravel.	Width (m)	2	
					Avg. depth (m)	0.7	
Context	Туре	Width	Depth	Description	Finds	Date	
No.		(m)	(m)	-			
21	Cut	1.04	0.28	Ditch	-	-	
22	Fill	-	0.28	Ditch	-	-	
Trench 11							
General c	lescription	1			Orientation	ENE-WSW	
Trench d	evoid of a	archaeolo	gy. Con	sisted of topsoil (0.4m) and	Length (m)	50	
subsoil (0	.4m) over	lying natu	ural geol	ogy of sandy gravels. Eastern	Width (m)	2	
two third	s of trenc	h contair	ned large	modern pit, possibly an old	Avg. depth (m)	0.8	
gravel pit	, test pitte	ed to 1.7n	· •				



Trench 12	2								
General c	General description Orientation NNW-SSE								
Trench co	ntained a	NE-SW d	sisted of made ground (0.4m-	Length (m)	50				
1m+) and	d subsoil	(0.2m)	Width (m)	2					
gravels. D	iesel cont	Avg. depth (m)	0.6						
most 10m	n of trench	า.							
Context	Туре	Width	Depth	Description	Finds	Date			
No.		(m)	(m)						
33	Layer	1.55	0.57	Ditch	-	-			
34	Layer	-	0.57	Ditch	-	-			
Trench 13	3								
General of	descriptio	n			Orientation	NNW-SSE			
Trench o	devoid of	Length (m)	50						
overlying natural geology of sandy gravels. Entire trench					Width (m)	2			
contamin	ated with	Avg. depth (m)	0.9						
Trench 14	1								
General c	description	n			Orientation	ENE-WSW			
Trench co	ntained t	wo NW-S	E ditches	, a N-S ditch and a cremation	Length (m)	50			
pit. Consisted of topsoil (0.3m) and subsoil (0.3m) overlying					Width (m)	2			
natural ge	eology of s	sandy gra	vels.		Avg. depth (m)	0.6			
Context	Туре	Width	Depth	Description	Finds	Date			
No.	51	(m)	(m)						
16	Cut	0.88	0.3	Cremation pit	-	LBA?			
17	Fill	-	0.15	Cremation pit	Cremated bone	LBA?			
18	Fill	-	0.2	Cremation pit	-	LBA?			
19	Cut	0.95	0.22	Ditch	-	RB			
20	Fill	-	0.22	Ditch	Pottery x1	RB			
49	Cut	1.44	0.6	Ditch	-	-			
50	Fill	-	0.3	Ditch		-			
51	Fill	-	0.5	Ditch	Animal bone,	-			
					fired clav				
52	Cut	1.7	0.54	Ditch	-	-			
53	Fill	-	0.21	Ditch	-	-			
54	Fill	-	0.22	Ditch	-	-			
55	Fill	-	0.24	Ditch	-	-			
Trench 15	5	l			1	1			
General		1			Orientation	NNW-SSF			
Trench co	ontained of	one NF-S	W ditch	Consisted of topsoil (0.3m)	Length (m)	50			
and subso	oil(0.3m) c	verlvina	natural o	eology of sandy gravels.	Width (m)	2			
					Ava. depth (m)	0.6			
Context	Type	Width	Denth	Description	Finds	Date			
No	1360	(m)	(m)	Description	THUS	Date			
35	Cut	11	0.4	Ditch	-	_			
36	Fill	-	0.4	Ditch		_			
30	1 111	-	0.4	DIGH	-	-			



Trench 1	6								
General of	General description Orientation ENE-WSW								
Trench d	evoid of	archaeolo	ogy. Con	sisted of topsoil (0.4m) and	Length (m)	50			
subsoil (0	0.3m) ove	erlying na	itural ge	ology of sandy gravels. The	Width (m)	2			
western-i	most 9m c	of the tree	nch conta	ained modern truncation and	Avg. depth (m)	0.7			
diesel cor	ntaminatio	on.							
Trench 1	7								
General of	descriptio	n			Orientation	NNW-SSE			
Trench co	ontained o	one NE-S	N ditch a	and a NW-SE ditch terminus.	Length (m)	50			
Consisted	d of tops	oil (0.4n	n) and s	subsoil (0.4-0.5m) overlying	Width (m)	2			
natural ge	eology of s	Avg. depth (m)	0.8						
Context	Туре	Width	Depth	Description	Finds	Date			
No.		(m)	(m)						
31	Cut	0.8	0.14	Ditch	-	-			
32	Fill	-	0.14	Ditch	-	-			
47	Cut	0.48	0.31	Ditch Terminus?	-	-			
48	Fill		0.31	Ditch Terminus?	-	-			
Trench 18	Trench 18								
General of	descriptio	n	Orientation	NNW-SSE					
Trench co	ontained 2	NE-SW d	itches an	d two E-W ditches. Consisted	Length (m)	50			
of topsoi	l (0.3m) a	nd subso	il (0.3m)	overlying natural geology of	Width (m)	2			
sandy gra	ivels.				Avg. depth (m)	0.6			
Context	Туре	Width	Depth	Description	Finds	Date			
No.		(m)	(m)						
39	Cut	0.62	0.33	Ditch	-	-			
40	Fill	-	0.33	Ditch	-	-			
41	Cut	0.58	0.24	Ditch	-	-			
42	Fill	-	0.24	Ditch	-	-			
43	Cut	0.68	0.24	Ditch	-	-			
44	Fill	-	0.24	Ditch	-	-			
45	Cut	0.92	0.34	Ditch	-	-			
46	Fill	-	0.34	Ditch	-	-			
Trench 19	9								
General of	descriptio	n			Orientation	ENE-WSW			
Trench co	ontained a	a NW-SE	ditch te	rminus. Consisted of topsoil	Length (m)	50			
(0.3m) a	nd subsoi	l (0.3m)	overlyin	g natural geology of sandy	Width (m)	2			
gravels.			-	•	Avg. depth (m)	0.60			
Context	Туре	Width	Depth	Description	Finds	Date			
No.		(m)	(m)	-					
37	Cut	1.1	0.33	Ditch terminus	-	-			
38	Fill	-	0.33	Ditch terminus	-	-			
Trench 20	C				·				
General of	descriptio	n			Orientation	NNW-SSE			
Trench d	evoid of a	archaeolo	ogy. Con	sisted of topsoil (0.4m) and	Length (m)	50			
subsoil (0	.3m) over	lying nati	ural geolo	ogy of silty sand.	Width (m)	2			
Ì		-	-	-	Avg. depth (m)	0.7			



APPENDIX B FINDS REPORTS

B.1 Prehistoric Pottery

By Matt Brudenell

B.1.1 Three small abraded body sherds (3g) of handmade shell-tempered prehistoric pottery were recovered from the upper fill of cremation pit **16**, context 18. The sherds cannot be closely dated with confidence, but the grade and sorting of the shell and the overall quality of ware suggests a Middle Bronze Age date, *c*. 1500-1150 BC. Material of this date has been found in numerous excavations in the Fengate area (e.g. Brudenell and Knight 2009).

v.1



B.2 Romano-British Pottery

By Stephen Wadeson

Introduction

B.1.2 A single rim sherd of Romano-British pottery, weighing 16g was recovered from part of a rectilinear field system, the sherd can be dated to the early to mid-Roman Period (mid-1st to 2nd centuries AD).

Methodology

B.1.3 The Roman pottery was analysed following guidelines recorded in A Standard for Pottery Studies in Archaeology (Barclay et al 2016, 14-18). The total assemblage was studied and a full catalogue was included in this report. The sherd was examined using a hand lens (x10 magnification) and were divided into fabric groups (Appendix 1) defined on the basis of inclusion types present. Vessel forms (cup, dish, bowl) are also recorded. The pottery was counted and weighed to the nearest whole gram and recorded by context. Decoration, residues and abrasion were also noted.

The Assemblage

- B.1.4 A single rim sherd of locally produced utilitarian coarse ware was recovered from context (20), Ditch **19**. The sherd is a Sandy white ware (NWW) with distinctive coarse grog inclusions (Timby 2007, p. 92, GR7) and which are most commonly found as globular lid-seated jars with fumed and soot blackened exteriors where they have been used as cooking pots.
- B.1.5 Moderately abraded and somewhat discoloured due to post depositional conditions the sherd appears sepia in colour, while retaining tracing of sooting around the rim suggesting its use in the preparation of food.

Discussion

- B.1.6 Recovered from the fill of Ditch **19**, part of a rectilinear field system the rim sherd has undergone high levels of post depositional disturbance, possibly due to middening and/or manuring as part of waste management processes during the Roman and post-Roman periods, suggesting that the sherd was not located at its primary site of deposition.
- B.1.7 The sherd is typical of those produced in the East Midlands in the early to mid-Roman era (Timby 2007, 117; Marney 1989), having developed from the local Iron Age tradition (Thompson 1984).
- B.1.8 The presence of only a single sherd of Romano-British pottery and the levels of postdepositional disturbance has made the assemblage difficult to assess beyond providing basic dating information. As such the sherd represents activity within the locality of the excavation during the Roman period from the mid-1st to 2nd centuries AD.



B.3 Fired Clay

By Ted Levermore

- A single fragment of fired clay (365g) was recovered from ditch 49 (fill 51) within B.4.1 Trench 14. It is probably the basal fragment of an early to middle Bronze Age cylindrical weight. It is made in a fine sandy clay with occasional fine rounded quartz, clay pellets and rare rounded fine to coarse voids. The clay appears to be untampered and is probably of local origin. The fragment is probably only 30% of the whole but it exhibits the hallmarks of a cylindrical weight; surviving measurements were the 95mm diameter and 20mm perforation diameter. From the vertical and angular fractures, it appears to have been made from a single folded lump of clay, that was shaped and smoothed while wet. It has been well fired, possessing a reduced grey core and dull brown oxidised surfaces. The base is blackened, but not sooted, suggesting extreme proximity to the original firing or secondary exposure to fire. The central vertical perforation, that is expected of a Bronze Age weight, is not clearly preserved. The surviving base has a circular feature in the centre but the inner body shows no sign of the perforation – it was probably lost when the clay fractured along the internal fold. The fabric and the recordable dimensions are almost identical to the near-complete weight found at Leeds Farm, Peterborough, however there the clay was much wetter at the forming stage leaving clear hand working traces on the surfaces (Collie 2017).
- B.4.2 This kind of object is usually considered to be a loom weight, where the central perforation is used to hang the object which provided tension for the vertical warp threads on a loom. This kind of object has been found in early to middle Bronze Age contexts across Britain. For example, at Covert Farm, Crick, some cylindrical weights were found in a pit which contained flax seeds that generated a radiocarbon date of c.1426-1281 cal BC (McSloy 2015, 207). Cylindrical weights like this one were also found at Bronze Age Fengate (Pryor 1980, fig. 13). It is likely, therefore, that the type and date of this object matches these examples.



APPENDIX C ENVIRONMENTAL REPORTS

C.1 Human Skeletal Remains

By Zoe Ui Choileain

Introduction & Methodology

- C.1.1 A single probable Middle Bronze age cremation burial weighing 200g was recorded in trench 14. Pit 16 was 0.88m in diameter and 0.30m deep. It contained a lower unurned fill (17) of charcoal and calcined human bone. Fill 17 was slumped into the pit on the Eastern edge. Upper fill 18, which contained fragments of Middle Bronze Age pottery, sealed the pit; suggesting that fill 17 is untruncated.
- C.1.2 All fills containing cremated bone were subject to 100% recovery and the material retained for wet sieving. Residues were passed through 10mm, 5mm and 2mm sieves. All bone was extracted for analysis. Recording of cremated bone was completed following the guidelines laid out by McKinley (2004).

Results

C.1.3 Several large skull fragments were recorded as were fragments of femur, humerus, ulna and tibia. Based on the presence of permanent tooth roots and the size and robustness of the bone it is estimated that this represents a single adult/older subadult individual. The bone is primarily chalk white in appearance with transverse longitudinal cracks. This suggests consistently high pyre temperatures.

Fraction	Weight (g)	Percentage of total weight
>10mm	132	66
5mm – 10mm	52	26
2mm – 5mm	16	8
Total	200	100

Table 1: Weight of cremated bone by fraction

- C.1.4 It is possible that this burial represents pyre debris. All fractions were rich in charcoal and the majority of the large fragments represent limb bones; which could be swept from the edge of the pyre. It seems most likely that remains were tipped into the edge of the pit rather than carefully deposited as one would expect from a ritual burial.
- C.1.5 The pottery fragments in the upper fill (18) were only tentatively dated to the Middle Bronze age due to their small size and it is therefore recommended that carbon dating be undertaken on the cremated bone if further excavation within the area takes place.

v.1



C.2 Animal Bone

By Zoe Ui Choileain

- C.2.1 A single adult cattle metacarpus was recovered from the fill (51) of boundary ditch 49.
- C.2.2 The bone weighed 78g and was in a poor condition, with an eroded surface. The single bone recovered from the ditch unfortunately tells us little of the pastoral regime undertaken during the Bronze Age period and is of limited use.

C.3 Environmental Samples

By Rachel Fosberry

Introduction& Methodology

- C.3.1 Nine bulk samples were taken from features within the evaluated area at Perkins Engines Site, Fengate, Peterborough in order to assess the quality of preservation of plant remains and their potential to provide useful data as part of further archaeological investigations. Samples were taken from undated ditch fills and a cremation pit.
- C.3.2 The total volume of each of the samples was processed by tank flotation using modified Siraff-type equipment for the recovery of preserved plant remains, dating evidence and any other artefactual evidence that might be present. The floating component (flot) of the samples was collected in a 0.3mm nylon mesh and the residue was washed through 10mm, 5mm, 2mm and a 0.5mm sieve.
- C.3.3 The dried flots were scanned using a binocular microscope at magnifications up to x 60 and an abbreviated list of the recorded remains are presented in Table 1. Identification of plant remains is with reference to the Digital Seed Atlas of the Netherlands (Cappers et al. 2006) and the authors' own reference collection

Quantification

C.3.4 For the purpose of this evaluation report, items such as seeds have been scanned and recorded qualitatively according to the following categories:

= 1-5, ## = 6-25 specimens

C.3.5 Items that cannot be easily quantified such as charcoal and molluscs have been scored for abundance

+ = rare, ++ = moderate, +++ = abundant

Results

C.3.6 Preservation of plant remains is extremely poor. All of the flots contain large quantities of modern rootlets which may have caused movement of material between contexts.

v.1



- C.3.7 Cremation **16** produced approximately 40ml of charcoal that is moderately preserved and may have potential for species identification. A single charred dock (*Rumex* sp.) seed was noted and a calcine human tooth was recovered from the residue.
- C.3.8 The ditch samples are all sterile other than a single charred seed of the knotgrass (*Polygonum* sp.) family in fill 24 of ditch **23** in Trench 3. Fill 11 of ditch **10** in Trench 5 was thought to be waterlogged on excavation but no preserved plant remains were noted other than abundant rootlets.

Tr. No.	Sample No.	Ctxt No.	Cut No.	Feature Type	% context sampled	Volume process ed (L)	Flot Volume (ml)	Weed Seeds	Charcoal <2mm	<i>Charcoal > 2mm</i>	Human skeletal remains
3	3	24	23	Ditch	<5	20	60	#	0	0	0
5	1	11	10	Ditch	10	18	40	0	0	0	0
14	2	7	16	Cremation	100	20	130	#	++++	++++	++
14	8	51	49	Ditch	<5	19	1	0	0	0	0
14	9	55	52	Ditch	<5	18	1	0	0	0	0
17	7	48	47	Ditch	50	10	20	0	0	0	0
18	5	40	39	Ditch	<5	18	20	0	0	0	0
18	6	46	45	Ditch	<5	18	40	0	0	0	0
19	4	38	37	Ditch	<5	18	10	0	0	0	0

Table 2: Environmental Samples

Discussion

C.3.9 The recovery of charcoal and occasional charred seeds indicates that there is potential for preservation of plant remains on this site, but only from deposits in which there has been deliberate deposition of charred material. There was no preservation by waterlogging in the samples from deeper deposits.



APPENDIX D BIBLIOGRAPHY

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APPENDIX E GEOPHYSICAL SURVEY REPORT





Geophysical Survey Report of Former Perkins Engines Site Newark Road, Fengate Peterborough

> For Oxford Archaeology East

On Behalf Of Cross Keys Homes Limited

Magnitude Surveys Ref: MSTL213 HER Event Number: 54105 December 2017



Former Perkins Engines Site, Newark Road, Fengate, Peterborough MSTL213 - Geophysical Survey Report DRAFT magnitude surveys Unit 17, Commerce Court **Challenge Way** Bradford BD48NW 01274 926020 info@magnitudesurveys.co.uk Report Written by: Chrys Harris BA MSc PhD **Figures Produced by:** Chrys Harris BA MSc PhD Report Checked by: Graeme Attwood MSc MCIfA Draft Issued: 19 December 2017

Abstract

Magnitude Surveys was commissioned to assess the subsurface archaeological potential of a c. 4.5ha area of land at the former Perkins Engines Site off Newark Road in Fengate, Peterborough. A fluxgate gradiometer survey was successfully completed and no anomalies of an archaeological origin have been identified. The geophysical results primarily reflect ferrous material and other waste debris. This is undoubtedly a reflection of the former modern use of the site, which included buildings, car parks, tracks, and recreational areas. A comparatively quiet strip along the southern end of site has revealed the presence of a series of linear, parallel responses that are characteristic of agricultural activity.



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Former Perkins Engines Site, Newark Road, Fengate, Peterborough MSTL213 - Geophysical Survey Report DRAFT

1. Introduction

- 1.1. Magnitude Surveys Ltd (MS) was commissioned by Oxford Archaeology East on behalf of Cross Keys Homes Limited to undertake a geophysical survey on a c. 4.5ha area of land encompassing the former Perkins Engines Site, off Newark Road in Fengate, Peterborough (TF 21378 00325).
- 1.2. The geophysical survey comprised a hand-pulled, cart-mounted fluxgate gradiometer survey. Given the brownfield history of the site, MS cautioned that any geophysical survey would likely be compromised by waste debris. The southern half of site was anticipated to be a less affected portion of the survey area, as it had been maintained as an open field throughout the site's modern use.
- 1.3. The survey was conducted in line with the current best practice guidelines produced by Historic England (David et al., 2008), the Chartered Institute for Archaeologists (ClfA, 2014) and the European Archaeological Council (Schmidt et al., 2015).
- 1.4. The survey was also conducted in-line with a written scheme of investigation (WSI) prepared by Oxford Archaeology East (Brudenell, 2017) in response to a brief by Peterborough City Council Archaeological Service.
- 1.5. The survey commenced on 14 December 2017 and took two days to complete.

2. Quality Assurance

- 2.1. Project management, survey work, data processing and report production have been carried out by qualified and professional geophysicists to standards exceeding the current best practice (ClfA, 2014; David et al., 2008, Schmidt et al., 2015).
- 2.2. Magnitude Surveys is a corporate member of ISAP (International Society of Archaeological Prospection). Director Graeme Attwood is a Member of the Chartered Institute for Archaeologists (CIfA), the chartered UK body for archaeologists, as well as the Secretary of GeoSIG, the CIfA Geophysics Special Interest Group. Director Finnegan Pope-Carter is a Fellow of the London Geological Society, the chartered UK body for geophysicists and geologists, as well as a member of GeoSIG, the CIfA Geophysics Special Interest Group. Director Finnegan Pope-Carter is a Fellow of the London Geological Society, the chartered UK body for geophysicists and geologists, as well as a member of GeoSIG, the CIfA Geophysics Special Interest Group. Director Chrys Harris has a PhD in archaeological geophysics from the University of Bradford and is the Vice-Chair of the International Society for Archaeological Prospection.
- 2.3. Per the requirements of the brief issued by Peterborough City Council Archaeological Service, data collection was repeated over the same traverses to demonstrate the consistency and reliability of the geophysical survey. These are presented below:
- 2.4. Traverse 121 and 54:

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2.5. Traverse 124 and 54:

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3. Objectives

3.1. The geophysical survey aimed to assess the subsurface archaeological potential of the survey area.

4. Geographic Background

4.1. The site is located towards the north-eastern fringe of Peterborough, to the west of Newark Road (Figure 1). Survey was undertaken over a disused grassland/scrubland lot that is situated in a built-up area (Figure 2). The site is bounded by Newark Road to the east, The Broadlands to the south, housing off Marriott Court to the north, and a car park to the west. The site previously contained former buildings and was used for sporting activities, including tennis lawns, bowling greens, and football pitches. Some of these features are visible on recent satellite imagery (Google Earth, 2017).

4.2. Survey considerations:

Survey Area	Ground Conditions	Further Notes
1	Flat, cut grass and scrubland. A significant amount of scattered metallic debris was present on the ground surface. A strip of tarmac flanking large holes was present running east-west through the centre of the site, with a thinner stripping abutting running north-south through the southern half. Two areas of tarmac at the north-western and south-western corners could not be surveyed. Two parallel ditches in the northern half of site delimited the former location of the bowling green.	Numerous boreholes were located in the southern half of site. The site was bounded by metallic fences on all sides.

- 4.3. The underlying geology comprises mudstone of the Kellaways Clay Member over the majority of the site. A small band of interbedded sandstone and siltstone is recorded through the southeastern corner. No superficial deposits are recorded (British Geological Survey, 2017).
- 4.4. The soils within the site are unrecorded, but consist of loamy and clayey floodplain soils to the east (Soilscapes, 2017).

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5. Archaeological Background

- 5.1. The following section summarises a discussion of the archaeological background of the site, as detailed in the WSI produced by Oxford Archaeology (Brudenell, 2017).
- 5.2. Prehistoric activity is known in the surrounding landscape. This includes Mesolithic, Neolithic, Bronze Age, and Iron Age activity. At The Broadlands, immediately to the south of site, Late Bronze Age/Early Iron Age features were identified in archaeological evaluations, with evidence for continued activity into the Roman and post-Roman periods.
- 5.3. A map regression undertaken of the site indicates an agricultural use into the medieval period. The 1821 Enclosure Map records the site as comprising four plots, with a gravel pit towards the east. By the time of the 1st Edition Ordnance Survey, the site is recorded as divided into two fields. The site was undeveloped in the mid-20th century until the construction of a wider sports facility in the 1970s, which is detailed in Section 4.1. Some remnants of these features were still visible on site at the time of survey (See Section 4.2).

6. Methodology

6.1.Data Collection

- 6.1.1. Geophysical prospection comprised the magnetic method as described in the following table.
- 6.1.2. Table of survey strategies:

Method	Instrument	Traverse Interval	Sample Interval
Magnetic	Bartington Instruments Grad-13 Digital Three-Axis Gradiometer	1m	200Hz reprojected to 0.125m

- 6.1.3. The magnetic data were collected using MS' bespoke hand-pulled cart system.
 - 6.1.3.1. MS' cart system was comprised of Bartington Instruments Grad 13 Digital Three-Axis Gradiometers. Positional referencing was through a Hemisphere S321 GNSS Smart Antenna RTK GPS outputting in NMEA mode to ensure high positional accuracy of collected measurements. The Hemisphere S321 GNSS Smart Antenna is accurate to 0.008m + 1ppm in the horizontal and 0.015m + 1ppm in the vertical.
 - 6.1.3.2. Magnetic and GPS data were stored on an SD card within MS' bespoke datalogger. The datalogger was continuously synced, via an in-field Wi-Fi unit, to servers within MS' offices. This allowed for data collection, processing and visualisation to be monitored in real-time as fieldwork was ongoing.
 - 6.1.3.3. Rows of temporary sight markers were established in each survey area to guide the surveyor and ensure full coverage with the cart. Data were collected by

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traversing the survey area along the longest possible lines, ensuring efficient data collection and processing.

6.2. Data Processing

6.2.1. Magnetic data were processed in bespoke in-house software produced by MS. Processing steps conform to Historic England's standards for "raw or minimally processed data" (see sect 4.2 in David et al., 2008: 11).

<u>Sensor Calibration</u> – The sensors were calibrated using a bespoke in-house algorithm, which conforms to Olsen et al. (2003).

Zero Median Traverse – The median of each sensor traverse is calculated within a specified range and subtracted from the collected data. This removes striping effects caused by small variations in sensor electronics.

<u>Projection to a Regular Grid</u> – Data collected using RTK GPS positioning requires a uniform grid projection to visualise data. Data are rotated to best fit an orthogonal grid projection and are resampled onto the grid using an inverse distance-weighting algorithm.

Interpolation to Square Pixels – Data are interpolated using a bicubic algorithm to increase the pixel density between sensor traverses. This produces images with square pixels for ease of visualisation.

6.3.Data Visualisation and Interpretation

- 6.3.1. This report presents the gradient of the sensors' total field data as greyscale images, as well as the total field data from the upper and/or lower sensors. The gradient of the sensors minimises external interferences and reduces the blown-out responses from ferrous and other high contrast material. However, the contrast of weak or ephemeral anomalies can be reduced through the process of calculating the gradient. Consequently, come features can be clearer in the respective gradient or total field datasets. Multiple greyscales images at different plotting ranges have been used for data interpretation. Greyscale images should be viewed alongside the XY trace plot (Figure 8). XY trace plots visualise the magnitude and form of the geophysical response, aiding in anomaly interpretation.
- 6.3.2. Geophysical results have been interpreted using greyscale images and XY traces in a layered environment, overlaid against open street maps, satellite imagery, historic maps, LiDAR data, and soil and geology maps. Google Earth (2017) was consulted as well, to compare the results with recent land usages.

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7. Results 7.1.Qualification

7.1.1. Geophysical results are not a map of the ground and are instead a direct measurement of subsurface properties. Detecting and mapping features requires that said features have properties that can be measured by the chosen technique(s) and that these properties have sufficient contrast with the background to be identifiable. The interpretation of any identified anomalies is inherently subjective. While the scrutiny of the results is undertaken by qualified, experienced individuals and rigorously checked for quality and consistency, it is often not possible to classify all anomaly sources. Where possible an anomaly source will be identified along with the certainty of the interpretation. The only way to improve the interpretation of results is through a process of comparing excavated results with the geophysical reports. MS actively seek feedback on their reports as well as reports of further work in order to constantly improve our knowledge and service.

7.2.Discussion

- 7.2.1. The geophysical results are presented in consideration with satellite imagery (Figure 6) and historic maps (Figure 7).
- 7.2.2. The fluxgate gradiometer survey has overall responded poorly to the conditions of site. This is undoubtedly a result of the recent modern use of the site and the amount of surface debris noted at the time of survey (see Section 4). The strength and density of the ferrous waste and debris material (Figure 8) does not allow for any weaker underlying features to be discerned across most of the site. A relatively quiet strip runs along the southern end of site with several quieter isolated patches throughout, including the location of the former bowling green.
- 7.2.3. Within the quiet strip along the southern end, a series of parallel, linear responses has been detected. The patterning of these responses is characteristic of ploughing and has been classified as 'Agricultural (Trend)'. The orientation of the ploughing is in-line with the historic field boundary to the south (Figure 7), which occurs on a different alignment to that of the present day (Figure 6).

7.3. Interpretation

7.3.1. General Statements

- 7.3.1.1. Geophysical anomalies will be discussed broadly as classification types across the survey area. Only anomalies that are distinctive or unusual will be discussed individually.
- 7.3.1.2. Ferrous (Discrete/Spread) Discrete ferrous-like, dipolar anomalies are likely to be the result of modern metallic disturbance on or near the ground surface. A ferrous spread refers to a concentrated deposition of these discrete, dipolar anomalies. Broad dipolar ferrous responses from modern metallic features, such as fences, gates, neighbouring buildings and services, may mask any weaker underlying archaeological anomalies should they be present.

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8. Conclusions

8.1. A fluxgate gradiometer survey has been successfully completed at the former Perkins Engines site, off Newark Road in Fengate, Peterborough. The survey has generally responded poorly to the conditions of the site, which has been compromised by ferrous waste and other debris material. The density and magnetic signal of this material will overshadow the responses of any weaker underlying features. A small strip of land along the site's southern boundary is relatively clear of magnetic debris. Within this area, anomalies identified as agricultural activity have been identified. These ploughing responses appear to align with the former boundaries of the site, instead of those of the present day.

9. Archiving

- 9.1. MS maintains an in-house digital archive, which is based on Schmidt and Ernenwein (2013). This stores the collected measurements, minimally processed data, georeferenced and ungeoreferenced images, XY traces and a copy of the final report.
- 9.2. MS contributes all reports to the ADS Grey Literature Library subject to any time embargo dictated by the client.
- 9.3. Whenever possible, MS has a policy of making data available to view in easy to use forms on its website. This can benefit the client by making all of their reports available in a single repository, while also being a useful resource for research. Should a client wish to impose a time embargo on the availability of data, this can be achieved in discussion with MS.

10. Copyright

10.1. Copyright and the intellectual property pertaining to all reports, figures, and datasets produced by Magnitude Services Ltd. is retained by MS. The client is given full licence to use such material for their own purposes. Permission must be sought by any third party wishing to use or reproduce any IP owned by MS.

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APPENDIX F OASIS REPORT FORM

Project Details

OASIS Number	Oxfordar3-307146		
Project Name	Former Perkins Engines Site,	Newark Road, Fengat	te
Start of Fieldwork	16/01/18	End of Fieldwork	23/01/18

Start of Fieldwork16/01/18End of FieldwPrevious WorkNoFuture Work

Project Reference Codes

		_	
Site Code	PETPES17	Planning App. No.	PAMAJ/17/00111
HER Number	PCCHER54105	Related Numbers	

Prompt	NPPF
Development Type	Industrial Units
Place in Planning Process	Pre-application

Techniques used (tick all that apply)

	Aerial Photography – interpretation		Grab-sampling		Remote Operated Vehicle Survey
	Aerial Photography - new		Gravity-core	\boxtimes	Sample Trenches
	Annotated Sketch		Laser Scanning		Survey/Recording of
					Fabric/Structure
	Augering		Measured Survey		Targeted Trenches
	Dendrochonological Survey	\boxtimes	Metal Detectors		Test Pits
	Documentary Search		Phosphate Survey		Topographic Survey
\boxtimes	Environmental Sampling		Photogrammetric Survey		Vibro-core
	Fieldwalking		Photographic Survey		Visual Inspection (Initial Site Visit)
	Geophysical Survey		Rectified Photography		

Monument	Period	Object	Period
Ditch	Bronze Age (- 2500	Pottery	Late Prehistoric (- 4000
	to - 700)		to 43)
Cremation Pit	Late Bronze Age (-	Pottery	Roman (43 to 410)
	1000 to - 700)		
Ditch	Uncertain	Cremated bone	Late Bronze Age (- 1000
			to - 700)

Insert more lines as appropriate.

Project Location

County	Cambridgeshire
District	Peterborough
Parish	Peterborough
HER office	Peterborough
Size of Study Area	4.4ha
National Grid Ref	TF 2138 0030

Address (including Postcode)

Land off Newark Road Peterborough PE1 5WG

Yes

Project Originators

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Organisation	Oxford Archaeology East
Project Brief Originator	Rebecca Casa-Hatton
Project Design Originator	Rob Wiseman
Project Manager	Matt Brudenell
Project Supervisor	Pat Moan

Project Archives

	Location	ID
Physical Archive (Finds)	Peterborough Museum	PPCHER54105
Digital Archive	OA East (Bar Hill)	PETPES17
Paper Archive	Peterborough Museum	PPCHER54105

Physical Contents	Present?	Digital files associated with Finds	Paperwork as with Finds	ssociated
Animal Bones	\boxtimes			
Ceramics	\boxtimes			
Environmental	\boxtimes			
Glass				
Human Remains	\boxtimes			
Industrial				
Leather				
Metal				
Stratigraphic				
Survey				
Textiles				
Wood				
Worked Bone				
Worked Stone/Lithic				
None		\boxtimes	\boxtimes	
Other				
Digital Media		Paper Media		
Digital Media Database		Paper Media Aerial Photos		
Digital Media Database GIS		Paper Media Aerial Photos Context Sheets		
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Figure 1: Site location showing archaeological trenches (black) in development area (red) Scale 1:5000





Figure 2: Overview of evaluation results, known archaeology (after Evans 2009, fig. 6.1) and selected HER entries Scale 1:12500

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Figure 6: Selected sections. Scale 1:25 and 1:20





Figure 7: Selected sections. Scale 1:25





Plate 1: 1 Baulk section of Trench 9, note level of overburden overlying original ground level



Plate 2: Trench 12, looking south-southeast. Note modern contamination





Plate 3: Trench 10, looking north-north-west, ditch 21 in foreground



Plate 4: Cremation Pit 16, Trench 14, looking west

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Plate 5: Ditch 49, Trench 14, looking north-west



Plate 6: Trench 17, ditch **31** and terminus **47**, looking north-west

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