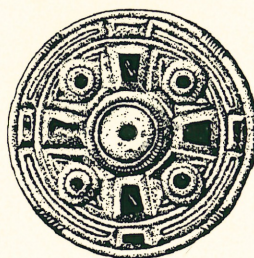


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Archaeological Field Unit

Chesterton Park, Cambridge:
An Archaeological Desktop Study

Richard Heawood

1997

Cambridgeshire County Council

Report No 138

Commissioned By RMJM on behalf of Chelverton Properties

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An Archaeological Desktop Study**

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SUMMARY

An archaeological desktop assessment of a large 90 hectare site on the north-east edge of the City of Cambridge was carried out by Cambridgeshire County Council's Archaeological Field Unit in response to a brief from the County Archaeology Office. The study was commissioned by RMJM on behalf of Chelverton Properties in advance of the proposed redevelopment of the site. The study area, centred on TL 475/615, is at present occupied by Cambridge Sewage Treatment Works to the north, and by Chesterton Railway Sidings to the south.

The study area lies in a zone of high archaeological potential on the gravel terraces of the River Cam. The surrounding area is rich in sites from the prehistoric, Roman, and Saxon periods, and several late prehistoric and Romano-British agricultural settlements extended along the west bank of the Cam to the north. Within the study area, it is known that human burials and pits containing animal bone and pottery were disturbed in 1903 during the extension of the Sewage Farm. This evidence suggests the existence of a late Iron Age and Romano-British settlement in the north-eastern corner of the study area. It has not proved possible to locate other specific areas of archaeological remains, but the high potential for the existence of such remains almost anywhere in the study area had been highlighted.

The impact of Twentieth Century disturbance on the survival of potential archaeological remains has also been assessed. The Sewage Treatment works has had a considerable impact towards the west of the study area, whilst a back-filled gravel pit within the railway sidings would have completely removed archaeological remains where it was excavated. However, it can be suggested that the impact of the early Sewage Farm on the north-eastern part of the site was probably limited, and that archaeological remains would survive here beneath dumped deposits. This seems to be confirmed by data from geotechnical trial holes, which also indicate the presence of 'wet' deposits near to the Cam. Elsewhere, remains might survive between and around the installations of the Sewage Treatment Works, and in the sidings, away from the gravel quarry.

Modern landuse means that aerial photography and geophysical survey are of very limited use in establishing the precise location of the archaeological remains that probably exist within the area. Trial trenching remains the best way of characterising these remains.

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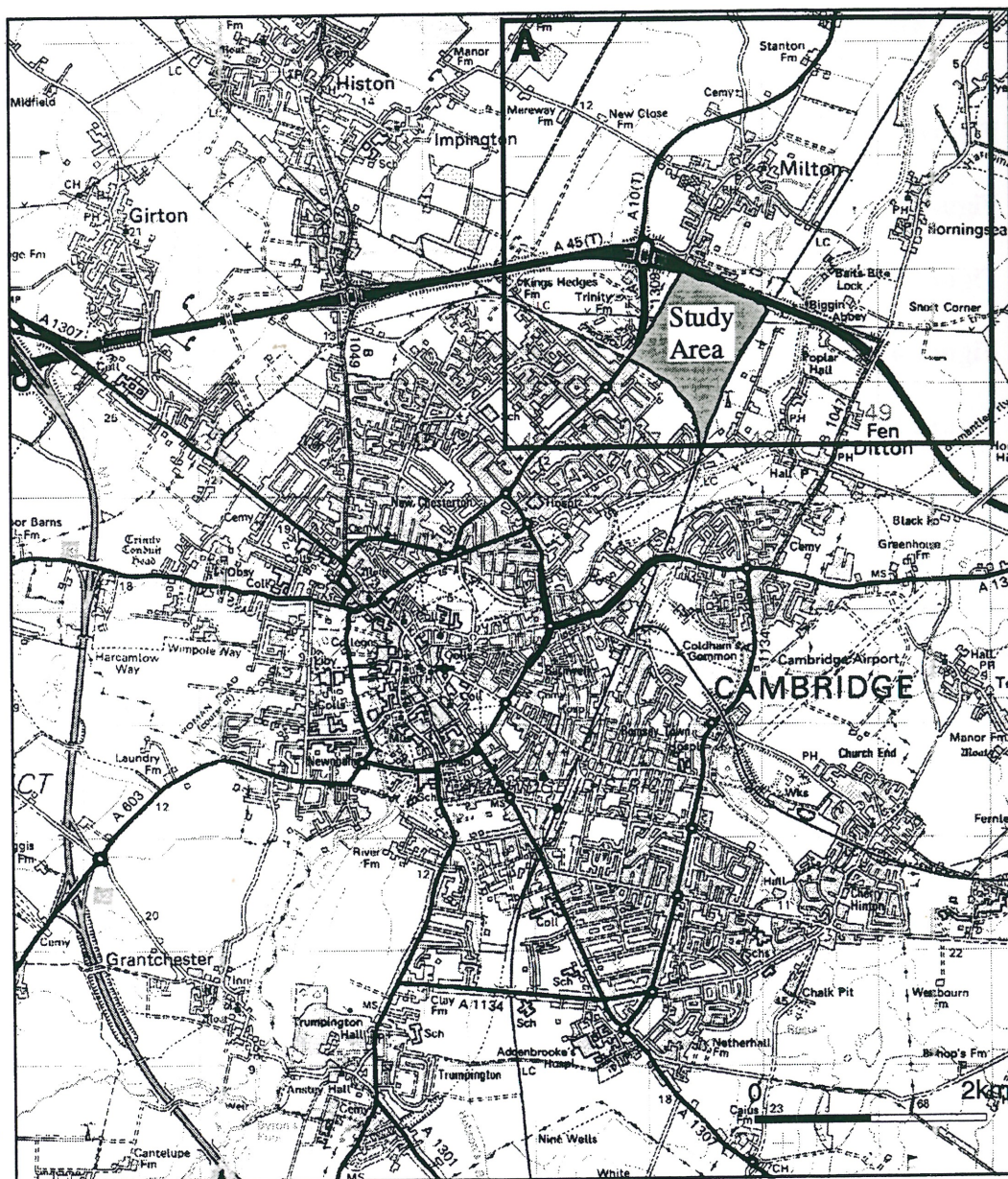


Figure 1 Site Location Plan

CHESTERTON PARK, CAMBRIDGE: AN ARCHAEOLOGICAL DESKTOP STUDY

1 INTRODUCTION

- 1.1 This desktop study was commissioned by RMJM on behalf of Chelverton Properties, in response to a brief prepared by the Cambridgeshire County Council Archaeology Office (Development Control). It assesses the archaeological potential of a site on the north-eastern edge of the city of Cambridge on which extensive redevelopment has been proposed.
- 1.2 The study area includes approximately 90 hectares of land, centred on TL 475/615. Most of the area is at present occupied by Cambridge Sewage Treatment Works, and by Chesterton Sidings.

2 TOPOGRAPHY AND GEOLOGY

- 2.1 The study area lies on the north-eastern edge of the city of Cambridge, between the former parish of Chesterton, now within the city, and the village of Milton. It is bounded to the north by the A14 Northern Bypass road, and to the south-east by the Cambridge to Ely railway line. The River Cam is c 400m to the south-east, and the site lies partly within the Cam's flood plain. The ground surface is at c 7m OD, and slopes down very gently towards the river.
- 2.2 The area is underlain by First and Second Terrace River Gravels overlying Gault Clay (Institute of Geological Sciences Sheet 188). In addition, contamination assessment probeholes located dark, organic, peaty deposits 0.1 - 1.4m thick, in the south-east corner where the study area extends close to the river. A marshy area is marked on an Ordnance Survey map of 1925 (Fig 6) in this area. Archaeological evaluation immediately to the north of the A14 revealed a series of fen and alluvial deposits overlying river terrace gravels. These survived to heights of up to c 4.0m OD (Robinson & Guttman 1996).

3 THE ARCHAEOLOGICAL BACKGROUND

3.1 General

- 3.1.1 The study area occupies gravel terraces on the north-west of the River Cam, and on the southern edge of the Fens. This location immediately suggests high archaeological potential, as it would have offered light fertile soils, combined



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Figure 2 Extract from Ordnance Survey 1:25,000 Map

with access to the resources of the nearby fenland. It would have remained attractive as a place for settlement throughout the prehistoric, Roman, Saxon, and medieval periods.

3.2 Early Prehistoric

- 3.2.1 The Cambridgeshire Sites and Monuments Record (SMR) shows that the study area is surrounded by a number of finds scatters and stray finds of early prehistoric date. It contains a reference to 'worked flints ...in abundance on the surface' roughly 400m south of the study area, across the Cam. The flints included flakes, blades, disks, and scrapers; burnt flints which may have served as pot boilers were also found. When the finds scatter was described in 1922, it was thought that the majority of flints were palaeolithic, but it has been suggested more recently that most were mesolithic or neolithic (Alison Taylor, SMR 05450). A second SMR record describes neolithic flints found *c* 200m to the east, possibly part of the same scatter (SMR 05451). The cluster included twelve blades and flakes and four scrapers. The flints are referred to in a relatively recent 'Gazetteer of Mesolithic Sites' (Wymer 1977) and are housed in the Sedgewick Museum of Geology.
- 3.2.2 To the south-west of the study area, and *c* 300m from it, three palaeolithic hand axes were found during gravel extraction (SMR 05224), and other 'prehistoric stone objects' are recorded nearby (SMR 05219).
- 3.2.3 To the north-east of the study area, a mesolithic tranche axe was found at a distance of 1.5km (SMR 05399). To the east, a neolithic greenstone axe was found at Biggin Abbey at a distance of *c* 500m (SMR 01095a), and a neolithic polished flint axe at a distance of 1.2km (SMR 05234). To the south-east, a neolithic stone axe from Fen Ditton was recorded at a distance of *c* 700m (SMR 05293a), whilst a neolithic stone axe and pebble hammer from the same 1km grid square lack a precise location (SMR 05297). Low density scatters of worked flint, the earliest pieces dating to the late mesolithic or early neolithic period, were found in association with alluvial soils sealed beneath further alluvial deposits immediately to the north of the study area (Robinson and Guttman 1996).
- 3.2.4 Whilst these artefacts do not demonstrate permanent settlement in these locations, they do suggest considerable early prehistoric activity in the Cam Valley close to the study area. The evidence dates both from the palaeolithic / mesolithic, characterised by a migrant hunter gatherer lifestyle, and from the neolithic when a sedentary agricultural way of life was beginning. Furthermore, it should be noted that many artefacts represent accidental finds made by non specialists, for example during gravel extraction. Any associated archaeological settlement features would have occurred as subtle variations in the subsoil, and would almost certainly not have been observed. Such features are also unlikely to be discovered by aerial photography, as at this period it seems that the landscape was not characterised by easily visible enclosures and land divisions.



Figure 3 Extract from Cambridgeshire SMR Map (1:10,560)

Given the density of finds, the absence of recognised settlement features should not be regarded as indicative of an unsettled landscape.

3.3 Bronze Age

- 3.3.1 The SMR records two Bronze Age hoards found in Brown's Gravel Pit *c* 500m south-west of the study area (SMR 05452). The Winship Hoard, regarded as a typical founders hoard, consisted of twenty-four socketed axes, seven axe fragments, three spear heads, three spear head fragments, and a variety of other tools and weapon fragments. A second hoard nearby consisted mainly of seventeen socketed axes and axe fragments.
- 3.3.2 A Bronze Age spear head seems to have been recovered from the Cam *c* 200m south of the study area (SMR 05228). At a greater distance, a considerable quantity of Bronze Age worked flint was identified on cultivated land *c* 1.4km to the east (SMR 07812). A Bronze Age flint knife lay slightly further away to the north-west (SMR 05403).
- 3.3.3 In addition, two undated ring ditches very close to the study area have shown up as cropmarks on aerial photographs. One is *c* 40m in diameter, and lies only 100m to the west (SMR 08326). The other is *c* 30m in diameter and lies *c* 300m beyond the north-western boundary of the study area (SMR 08329). Although undated, ring ditches are typically seen when Bronze Age funerary monuments have been flattened by later disturbance such as ploughing, so that only the outer ditch survives. They are of considerable archaeological interest.
- 3.3.4 As with the early prehistoric period, an unsettled landscape should not be envisaged. Given the favourable geology and topography, and the presence of hoards, stray finds, and ring ditches, it seems more probable that settlement evidence is yet to be located.

3.4 Iron Age

- 3.4.1 For the Iron Age, there is good evidence for several settlement sites close to the study area. At Arbury Road, *c* 1.5km to the west, excavation in 1968/9 produced evidence for pottery, pits, a timber structure, an oven / hearth, and metalworking debris, predating a Roman settlement (SMR 05413a, 05414a, 05415a). At the landfill site at Milton (*c* 500m to the north-west of the study area) salvage excavation and on-going training excavations by the Archaeological Field Unit are elucidating an archaeological sequence beginning with late neolithic or early bronze age activity, and including Iron Age and Romano-British settlement remains (Bray and Reynolds 1997; Connor 1997).
- 3.4.2 To the south-west of the study area, at a distance of *c* 2km, a substantial settlement was excavated at Manor Farm, occupied from the Iron Age into the Roman period. Site vii produced a Belgic and pre-Belgic settlement (SMR 05424).

- 3.4.3 Again to the west, at a distance of 2.5km, the fragmentary remains of Arbury Camp still survive. Although no evidence of occupation within the enclosure has been found, this monument was probably in use in the pre-Roman period, functioning as a fort cum stock enclosure (SMR 08479).
- 3.4.4 The SMR also records settlement evidence much closer to the study area. Pits containing Iron Age pottery were found in Brown's Gravel Pit *c* 400m to the south-west (SMR 05452a). To the south, a cremation burial, pottery, bronze objects, and flints may have been from a gravel pit within *c* 50m of the study area, although these finds may be derived from another nearby pit (SMR 05539).
- 3.4.5 To the north, Iron Age pottery was found *c* 500m beyond the study area. From roughly this point northwards, a dense swathe of cropmark evidence indicates intensive settlement of the gravel terraces north-west of the Cam. Some of this occupation probably originated in the Iron Age. For example, *c* 1km to the north of the study area, a complex of double ditches enclosures exists a cropmark, with evidence for dense internal settlement (SMR 08322). It has been suggested that the penannular enclosures at the northern end suggest occupation in the Iron Age (Oxford Archaeological Unit 1993).
- 3.4.6 For this period, there is also direct evidence for the existence of archaeological remains within the study area itself (SMR 05281). This is discussed below (para 4.1.1).

3.5 Romano-British

- 3.5.1 In the Roman period, Cambridge grew up as a military centre, and subsequently as a market town. Its importance was based in part on the agricultural richness of the fenland to the north, and a series of waterways was cut to improve communications in the region (Oxford Archaeological Unit 1993). One such was Car Dyke, a canal linking the Cam with the Ouse, the southern end of which lies *c* 3km north of the study area. Pottery kilns are known from Milton (SMR 05679, 500m north of the study area), and more significantly, from Horningsea (SMR 05546, *c* 2km north-east).
- 3.5.2 The study area lies at the south-western end of a very dense system of cropmark enclosures (eg SMR 05865). Although some may have originated in the late Iron Age (para 3.4.5 above), many appear to represent closely spaced Romano-British farming settlements following the line of the First and Second Terrace river gravels. This part of the Roman landscape was bounded by the Cam to the south-east, Car Dyke to the north, and Akeman Street to the north-west. The latter was a Roman road following an outcrop of gault clay which was generally sparsely settled (Oxford Archaeological Unit 1993, Evans 1991).
- 3.5.3 Although the main area of cropmarks to the north of the study area ends *c* 600m from it, SMR references to Roman stray finds continue south. The southern limit to the concentrated cropmark evidence may simply be a result of

widespread gravel extraction south of Milton village before aerial photographic coverage was achieved (see para 4.1.4 below). Two SMR references to cropmarks here appear to be spurious and give no references (SMR 05308, 05536). A variety of finds have come from this area including: a pottery kiln (SMR 05679); Roman pottery (SMR 05677); ditches containing Roman pottery (SMR 05536 and 05678); and a lead emperor figure (SMR 05533).

3.5.4 Stray finds of Roman pottery are also recorded close to the southern corner of the study area (SMR 05539a, 05227).

3.5.5 Excavated Romano-British evidence found within the site itself is discussed below (para 4.1.1). However, it should be noted here that recent evaluation trenching by Cambridgeshire County Council's Archaeological Field Unit has extended to within 200m of the study area to the north-east (Robinson and Guttman 1996). Extensive terrace-edge settlement was sampled to the north, although nearest to the study area, a series of low density linear cropmarks running at right angles to the river Cam and east of the quarried areas were investigated. They were found to correspond to ditches. Only one ditch could be dated (a date in the third or fourth centuries AD was suggested), but useful information about the depths of archaeological deposits here was obtained (para 5.2.3 below).

3.5.6 A further considerable concentration of Romano-British remains was located further from the study area, where Akeman Street approached Cambridge, c 1.5km to the west. Rescue excavations carried out in the 1950's and 1960's in advance of housing development have produced evidence for settlement and burial over a considerable area. A Roman mortuary structure and with accompanying inhumation burials is recorded in the SMR (SMR 05425), as well as evidence for cremations with associated high status grave goods (SMR 05425, 05429), and further mixed cremations and inhumations (05430). Evidence for relatively high status buildings was found at Manor Farm, Arbury (SMR 05411 / 053421 / 05424 ?duplicate numbers). It seems probable that a substantial house or villa was located here, in addition to a lower status rural settlement, and groups of roadside burials.

3.6 Anglo-Saxon and Medieval

3.6.1 Anglo-Saxon settlements often prove difficult to identify: their timber buildings are usually only represented by subtle changes in the subsoil, whilst Anglo-Saxon pottery does not survive well in ploughsoil, and may originally have been used only in relatively small quantities. The environs of the study area have produced a variety of evidence for Anglo-Saxon occupation, which is reviewed below. Although there is as yet no direct evidence for settlement within 2km, it should not be assumed that Anglo-Saxon settlements were absent.

3.6.2 The nearest known Anglo-Saxon settlement evidence is at least 2km to the north. Early Anglo-Saxon sunken featured buildings were found in the early twentieth century (SMR 09049), close to the south end of Car Dyke. Similarly

early features pertaining to settlement have been revealed in Waterbeach (Mortimer 1996). Closer to the study area, recent evaluation work has confirmed the presence of early Saxon settlement features (including 'hall' like buildings) in association with previously identified artefact scatters (Robinson and Guttman 1996).

- 3.6.3 Further south, evidence for one or more inhumations comes from Swan's Gravel Pit on the southern corner of the study area (SMR 05540). An Anglo-Saxon scramasax was found in the Cam c 500m to the south-west (SMR 05523). At least 1km to the south-east, two Anglo-Saxon brooches were found (SMR 05480), perhaps suggesting the former presence of an inhumation.
- 3.6.4 Further afield, c 2km to the south-west, tenth century pottery was found in a rubbish pit in Arbury (SMR 05424a). In the opposite direction, finds of sceattas and early - middle Saxon pottery sherds are recorded c 2km to the north-east.
- 3.6.5 The recently recovered evidence suggests the presence of dispersed early Anglo-Saxon settlement clusters (farmsteads, or hamlets), along the Cam terraces.
- 3.6.5 In the late Saxon and medieval periods, settlement in this region seems to have nucleated on the sites of present day villages. Landuse in the medieval period can be deduced from cartographic sources and estate surveys (para 4.2 below).

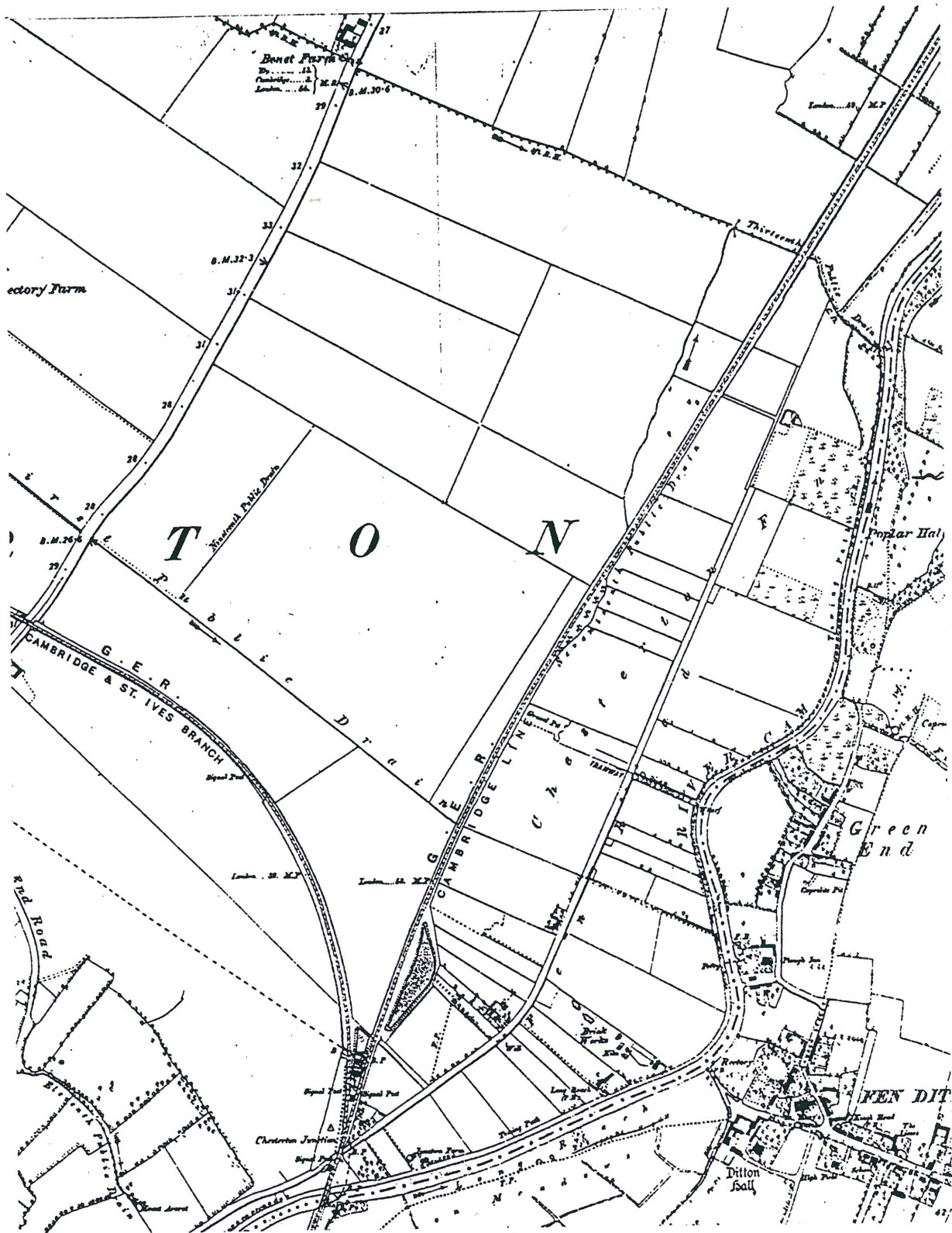
4 THE ARCHAEOLOGY AND HISTORY OF THE STUDY AREA

4.1 Known Archaeological Remains

- 4.1.1 On the north edge of the study area there is clear evidence for a settlement occupied in the late Iron Age and Roman periods, and for human inhumation burials which were probably associated with it (SMR 05281). Although the SMR record has a grid reference point on the planning application boundary, it seems clear that the remains covered a considerable area, and extended into the study area.
- 4.1.2 The remains were disturbed during extension works to Cambridge Sewage Farm in 1903. Artefacts were recovered by the workmen, and the site was subsequently visited by Professor McKenny Hughes. The size of the area in question is not defined, but it lay in the north-east corner of the sewage farm, around probably around grid reference TL 4792/6173. McKenny Hughes was able to examine the area, and obtain further information by talking to the workmen. He reported that there were 'a good many human remains, and most of these came from graves of irregular occurrence over the area'. Pottery and the remains of domestic animals were found mainly in pits, but also occurred in spreads. The pottery was said to be 'very mixed in character', with much coarseware similar to that found in Horningsea; some was also of 'hooped barrel type' (McKenny Hughes 1904). Fine wares and Samian ware were scarce,

and it was concluded that this was 'an agricultural village of the Romanised Britons'.

- 4.1.3 The site was briefly reviewed by Cyril Fox two decades later (Fox 1923). He suggested that the presence of 'cordoned urns of Aylesford type' implied occupation prior to the Claudian conquest (Fox 1923, 110). He also referred to 'barrel- or butt- shaped urns' dating from the first century BC to the Roman occupation (ibid, 91). These vessels had oblique rims, 'a feature frequently met with in the early Romano-British or Romano-Belgic wares found locally'.
- 4.1.4 It seems clear that the series of late Iron Age and Romano-British agricultural settlements known from cropmark evidence on the gravel terraces to the east and north of Milton continued southwards into the study area (para 3.5.2). An RAF aerial photograph shows that considerable gravel extraction immediately north of the study area had already occurred by 1946 (CRO AP 19404). This means that any cropmarks in the quarried area would have been completely destroyed at this time, before most aerial photographs were taken. It should also be noted that the twentieth century land uses within the study area itself (paras 4.3, 5.1.1 below) also largely preclude the recognition of archaeological remains using aerial photography (Appendix A).
- 4.1.5 From the brief published descriptions, it seems that the archaeological evidence found in 1903 demonstrates continued occupation of this settlement from the late Iron Age into the Roman period. McKenny Hughes refers to 'much ... coarseware such as we find at Horningsea', and to a 'scarcity' rather than an absence of Samian (McKenny Hughes 1904). The Horningsea wares are thought to have begun production at around AD 120 (Oxford Archaeological Unit 1993).
- 4.1.6 In this north-eastern corner of the study area, it might be expected that timber houses would have existed relatively close to the pits that were observed. It is possible that structural features existed in the area disturbed in 1903, and were not recognised by the workmen.
- 4.1.7 In addition, it is probable that the landscape was delineated by boundaries and field systems relating to the settlement. Similar features may also exist relating to other periods of occupation of the gravel terrace. The recent trenching to the north extended to within 200m of the study area, and revealed a number of double ditch features, probable boundaries dividing the low lying land to the west of the River Cam (Robinson and Guttman 1996). One ditch produced pottery suggesting it may have been open in the third or fourth centuries AD. In the Trench 3, nearest the study area, ditches were encountered at a depth of 0.40m, and were sealed by medieval or post medieval alluvium.
- 4.1.8 Although the known archaeology within the study area is late Iron Age and Romano-British, the archaeological background of the surrounding area strongly suggests the possibility of remains existing from several periods. In particular, it should be noted that two cropmark ring ditches (SMR 08326, 08329), possibly representing bronze age funerary monuments, both lay within 200m of the study



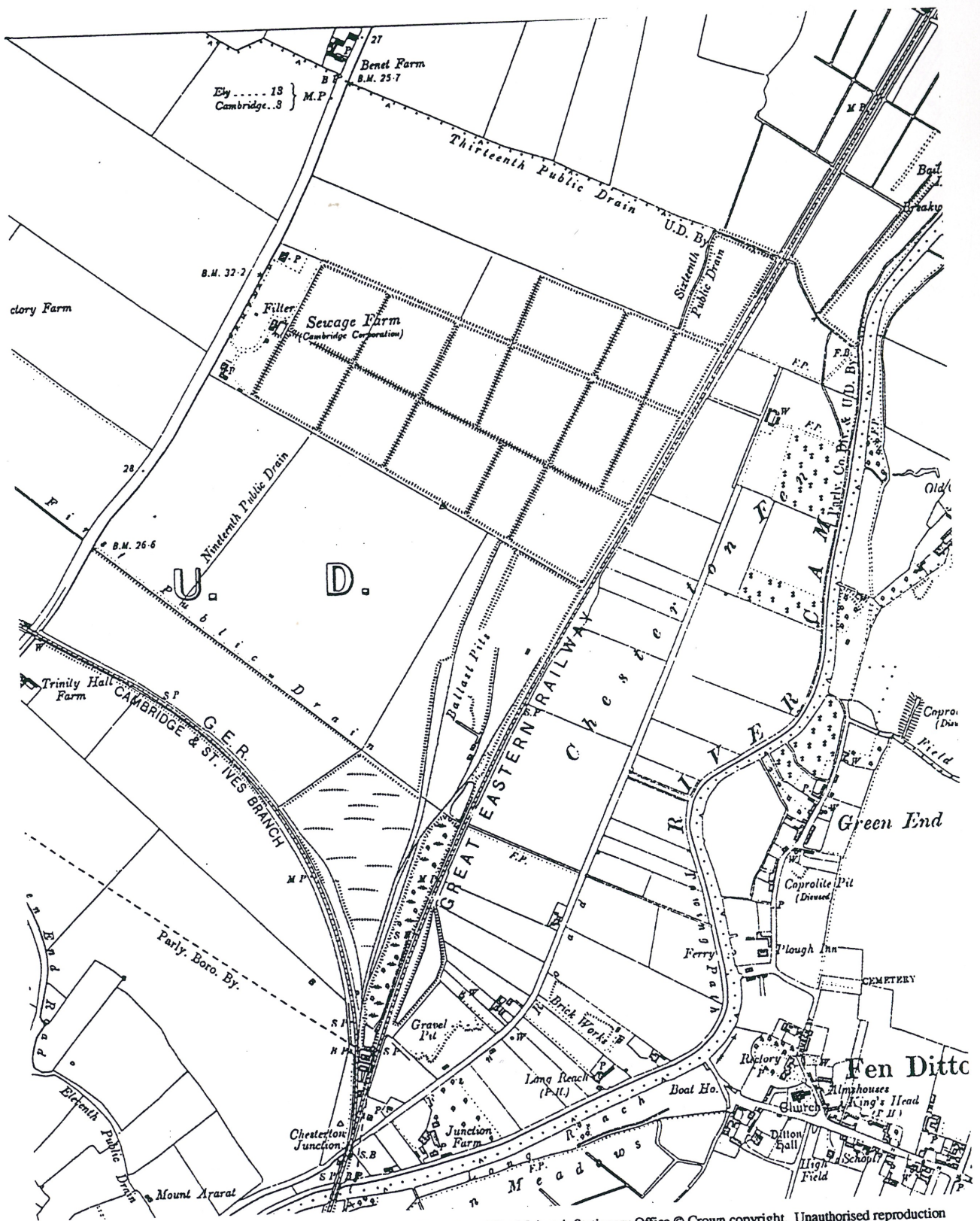
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Figure 4 Extract from Ordnance Survey Map of 1889 (1:10,560)

area. The paucity of previously recorded archaeological finds within the study area boundaries is more likely to be a reflection of the area's modern land use rather than a paucity of activity.

4.2 Medieval and Post-medieval Landuse

- 4.2.1 The use of the site in the medieval and post-medieval periods was established by research on cartographic and documentary sources carried out by Dr T Way at the Cambridge Record Office.
- 4.2.2 The study area seems to have been within the large open 'East Field' of Chesterton, one of three open fields in the parish. The eastern boundary of the East field appears to survive as the line of the Cambridge to Ely railway, which bounds the study area on the east side. Medieval documents were not viewed, but terriers from the sixteenth and seventeenth centuries were consulted, and showed the arable usage of the area, giving the names of various landmarks (CRO P40/28/2; CRO P40/25/17; CRO P40/25/16). The remains of ridge and furrow cultivation may exist as archaeological features within the study area.
- 4.2.3 Secondary sources reviewed in the Victoria County History (Victoria County History 1989) suggested that the layout of the open fields had remained stable since the thirteenth century. There was also a thirteenth century record of a common marsh lying to the south-east of the East Field (Victoria County History 1989).
- 4.2.4 Although the East Field seems to have continued in use for several centuries, change was occurring immediately to the east, in the area between the study area and the River Cam. The sixteenth and seventeenth century terriers suggest the development of a series of small closes where the common marsh had been (CRO P40/28/2; CRO P40/25/17; CRO P40/25/16).
- 4.2.5 The Draft Inclosure Map of 1838 shows that considerable inclosure had taken place before the Inclosure Act of 1840 (CRO R68/59nd). The East Field was clearly divided into a series of separate fields, with the names of the landowners and leaseholders sometimes attached. The elongated shapes of these fields on two alignments suggest that they had been formed by the inclosure of groups of strips from the old open field.
- 4.2.6 At Inclosure in 1840, the division of the land between several of the larger landowners of the parish was formalised and recorded on the Inclosure Map (CRO Q/RDc 59). Apart from showing the relatively new field boundaries, the Draft Inclosure and Inclosure Maps (CRO R68/59nd, CRO Q/RDc 59) show the First Public Drain crossing the study area from west to east, and the Sixteenth Drain just within the study area at its north-east corner. It is probable that these drains will be present as archaeological features today, though Cowley Road follows the First Public Drain for part of its length.



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Figure 5 Extract from Ordnance Survey Map of 1904 (1:10,560)

- 4.2.7 A small gravel pit shown on the 1840 Inclosure Map lay just beyond the southern corner of the study area, immediately to the east of it.
- 4.2.8 The Railway lines bounding the study area to the south and east were constructed in the 1840's and 1850's (Taylor 1973).

4.3 Twentieth Century Landuse

- 4.3.1 The Ordnance Survey 1:10560 Map of 1889 (Ordnance Survey 1889) shows a pattern of agricultural fields over the study area which had changed little since 1840. However, change was imminent. In the twentieth century a sewage farm and subsequently a sewage works occupied the northern and western part of the area, whilst railway sidings developed to the south-east.
- 4.3.2 Work on the sewage farm commenced in 1895 (Anglian Water 1995). Sewage was first pumped to the farm later that year, and by 1896 it occupied 102 acres. Initially a large part of the farm was left uncropped, with the soil being used as a bacterial filter. The farm was divided into rectangular plots of between three and six acres in size, with carrier embankments on three sides of each plot, and a retaining bank on the fourth side. These plots formed lagoons or drying beds.
- 4.3.3 In 1911 the sewage farm was expanded to cover 164 acres, and part of the farm was increasingly cropped. It reached its maximum size of 177 acres in 1923.
- 4.3.4 By 1937, it was necessary to begin work on a more advanced sewage works. Treatment on the land continued until 1957, when further improvement of the works rendered land treatment obsolete. Apart for an area still used for lagooning sludge, the sewage farm reverted to agricultural use.
- 4.3.5 The expansion and contraction of the sewage farm can be seen on the Ordnance Survey maps of 1904, 1928 revised 1938, 1925 revised 1950, 1959, and 1974. The farm is also visible on aerial photographs of 1946 (CRO AP 19404) and 1977 (CUCAP CCO 051). The area which reverted to agricultural use can be seen to comprise of: 1) Two small fields to the north-west of the present railway sidings, and 2) four large fields to the north of Cowley Road and to the north-west of the sidings. In the 1980's and 1990's the modern sewage works expanded into the former area. The latter, although included on the master plans for the area in which development is now proposed, is excluded from the present planning application. In the past two decades, part of it has been used for retail and light industrial development, whilst the remainder has stood open as an agricultural machinery market and car parking area.
- 4.3.6 The south-eastern part of the study area lay outside the sewage farm. The Ordnance Survey 1:10560 Map of 1904 shows that ballast pits for gravel extraction had been opened in part of this area since 1889 (Fig 5). Subsequently this seems to have been an area of little used marshy ground until railway sidings began to develop alongside the existing railway lines to the south and east. A small number of sidings are visible on the Ordnance Survey 1:10560 Map of



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Figure 6 Extract from Ordnance Survey Map of 1925, Additions in 1950 (1:10,560)

1928, revised 1938. The expansion of the sidings to cover the whole area can be traced on an aerial photograph of 1946 (CRO AP 19404), and on Ordnance Survey Maps of 1950, 1958, (both 1:10560) and 1974 (1:10000). A small number of isolated railway buildings was also constructed around the sidings.

- 4.3.7 The sidings remain in use today. An aggregates handling plant with weighbridge has also been added at the north-east end of the sidings since 1974, and is operated by Redlands.

5 THE POTENTIAL FOR THE SURVIVAL OF ARCHAEOLOGICAL DEPOSITS

5.1 General Considerations

- 5.1.1 The twentieth century landuse of the site means that aerial photography is of little value in determining particular areas of potential, and assessing whether remains still survive. In the area of the former sewage farm, very regular dumping of large quantities of sewage sludge can be expected to have masked any archaeological features. Likewise, to the south-east, the railway sidings and dumping of cinders and make-up would completely obscure any archaeological remains.
- 5.1.2 With the exception of traces of ridge and furrow there is no direct aerial photographic evidence for archaeological remains within the study area. However the landuse problems described here mean that aerial photography cannot be used to suggest that archaeological features do not survive.
- 5.1.3 Chapter 4.1 above has demonstrated that Iron Age and Romano-British remains definitely existed in the north-east part of the study area, and has suggested the strong probability that remains from a variety of periods also exist elsewhere within the subject area.
- 5.1.4 The present day archaeological potential of the study area must depend largely on the impact on the underlying deposits of the sewage farm, sewage works, and railway sidings. If this impact was limited, the archaeological background suggests that archaeological remains will be present over this large 90 hectare area.

5.2 The Impact of the Sewage Farm

- 5.2.1 It is known that the ground surface was levelled prior to the laying out of rectangular plots and embankments (Anglian Water 1995). 'Under drainage' and the construction of a system of sewage carriers was also carried out.

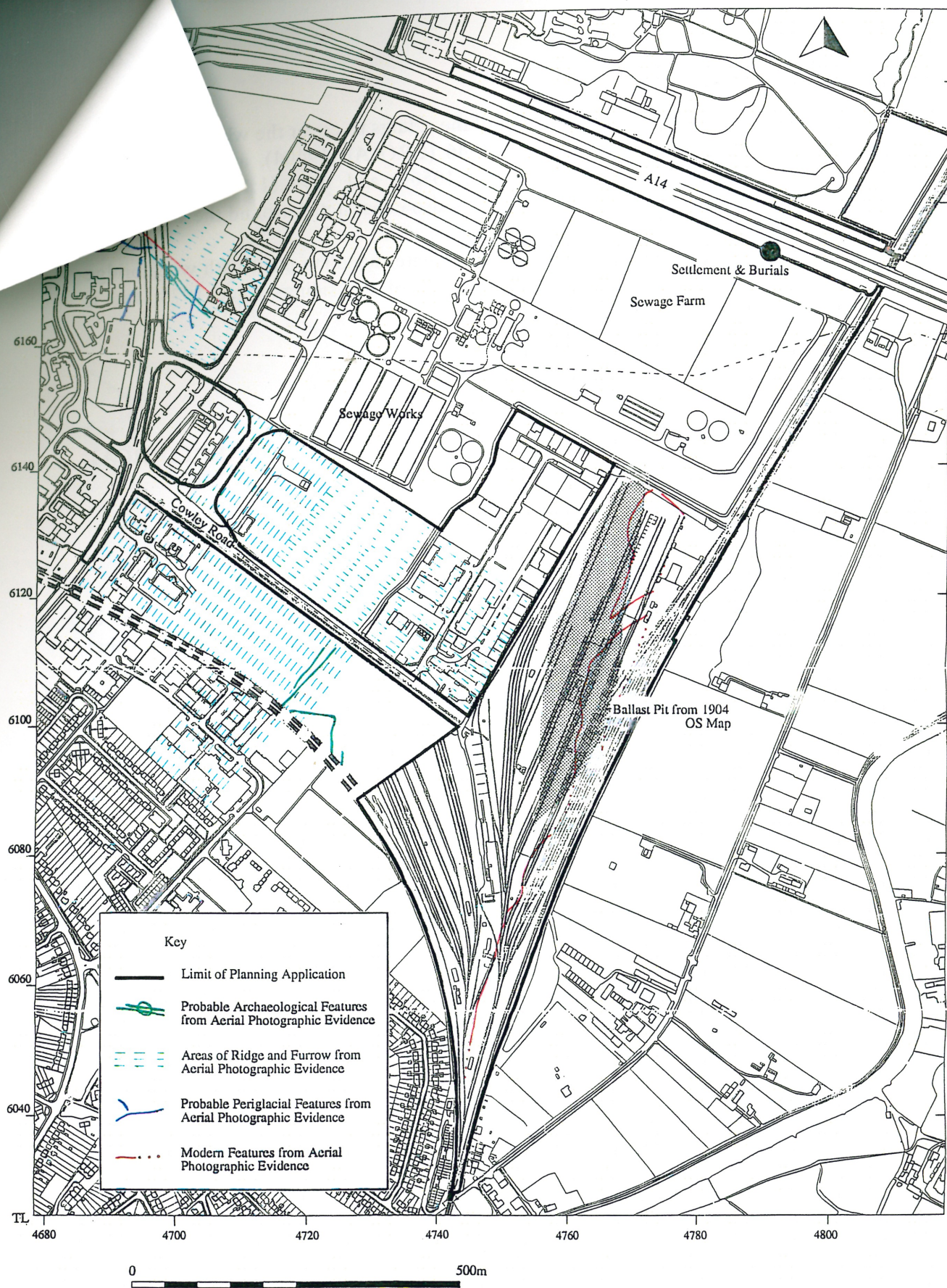


Figure 7 Plan of the study area, showing limit of planning application and aerial photographic evidence

- 5.2.2 It is uncertain whether the levelling would have disturbed archaeological deposits, especially as levelling might involve the building up of some areas as well as the reduction of others. No detailed plans or descriptions of this activity can be located.
- 5.2.3 Recent archaeological evaluation *c* 200m to the north-east (Robinson and Guttman 1996) showed that near the Cam, Romano-British archaeological deposits were often sealed below a layer of medieval or post-medieval alluvium below the ploughzone. Earlier alluvial deposits were recorded, and the surface of the gravel lay *c* 1m below the present ground surface. This suggests that prehistoric features and finds might be up to 1m deep in lower-lying part of the study area.
- 5.2.4 It is known that in the north-east corner of the study area, works associated with the expansion of the sewage farm in 1903 disturbed Iron Age and Romano-British deposits (para 4.1). However, it is not known whether the disturbance was the product of uniform levelling of the site, or of unusual ground reduction, for example relating to the laying of drains. The extent of damage to this site is unknown.
- 5.2.5 Although some disturbance was caused to late Iron Age and Romano-British deposits, earlier prehistoric deposits may have existed up to 0.5m deeper, and may not have been damaged.
- 5.2.6 Field observation in the northern part of the former sewage farm suggests that here the ground surface is considerably higher than the area of pasture beyond the railway to the east. This suggests that substantial ground reduction may not have taken place.
- 5.2.7 A description of the construction of the early sewage farm refers to 'the carrier embankments forming an enclosure ... and the remaining side being banked up to retain sewage' (Anglian Water 1995). This again suggests that the sewage farm plots may have been produced by levelling off and building up, rather than by large scale excavation. Subsequently, deposition of sewage sludge can be expected to have raised the ground surface, masking and protecting archaeological remains.
- 5.2.8 Within the sewage works and sewage farm, a series of 56 trial pits were dug by Wimpey Environmental in 1995 to assess ground conditions and the possibility of contamination (Wimpey Environmental, 1995).
- 5.2.9 45 of 56 pits showed a depth of modern fill, typically 0.5 - 1.10m deep, but sometimes shallower, confirming that large scale twentieth century deposition had occurred.
- 5.2.10 10 trial pits, predominantly in the eastern and northern part of the site produced deposits of 'silt', generally at shallow depths and immediately below either topsoil or modern fill. The presence of this 'silt' suggests that, in the northern and eastern part of the study area, elements of a natural soil profile may survive

below the topsoil and modern fill. The silt had an average thickness of 0.75m, and was described as stiff or very stiff, and clayey. It probably represents alluvium deposited by the Cam over underlying gravels.

5.2.11 In the majority of test pits across the whole area, deposits of 'silty sand' were identified above the sands and gravels. It is thought likely that a soil classification system was used by Wimpey Environmental which stressed the 'sand' content of a deposit more than systems used by most archaeologists. Again, where 'silty sands' were identified, it seems probable that naturally formed subsoil deposits, perhaps of alluvial origin, were still present.

5.2.12 The sands and gravels of the river terrace were identified in 53 of 56 trial pits. This further confirms that large scale excavation did not accompany the construction of the sewage farm, and that substantial gravel extraction has not taken place.

5.2.13 The inspection of the existing trial pit data supports the conclusion that the construction of the sewage farm did not involve large scale ground reduction. Archaeological deposits may survive wherever truncation by modern structures is not evident.

5.3 The Impact of the Sewage Works

5.3.1 Mapped evidence and field observation suggests that the sewage works will have caused severe disturbance to archaeological remains present beneath the substantial installations in the north-western and central parts of the study area. However, archaeological features may survive between the tanks and buildings, and beneath structures without deep foundations.

5.4 The Impact of Gravel Extraction in the Railway Sidings Area

5.4.1 Ballast pits have been identified on an early Ordnance Survey map of 1904 towards the north end of the area of the present railway sidings (para 4.3.6). Archaeological deposits will not survive in this area (Figs 5, 7).

5.5 The Impact of the Railway Sidings

5.5.1 The foundations of a small number of buildings may have caused disturbance to archaeological deposits (Fig 7). The Redlands aggregates plant and weighbridge at the north end of the sidings again has had a probable impact on underlying deposits. Some disturbance may also have been caused by a variety of service trenches.

5.5.2 However, there is no reason to suppose that activities relating to the railway sidings should have caused substantial large scale disturbance to archaeological deposits. The construction of the sidings would have involved the laying of hard

standing, and of sleepers and railway tracks. Given that the area appears marshy on the Ordnance Survey maps of 1904 and 1928/38, it would be natural to build the ground level up rather than to reduce it. Field observation suggested that, at the southern end of the sidings, the ground level was indeed c 1m higher than that to the east and west. It can be suggested that the laying of hard standing and dumping of cinders from locomotives might have served to mask and protect archaeological deposits.

- 5.5.3 These conclusions can be cross checked with the results from probe holes inserted to evaluate contamination levels in 1995 (Soil Mechanics 1995).
- 5.5.4 Made ground was identified in 34 of 35 probe holes, with an average thickness of 1.5m. Dark organic clayey deposits were recognised at 20 locations, underlying the made ground, varying between 0.1 and 1.4m thick. They may represent alluvium. River terrace deposits were also encountered at 17 locations concentrated at the eastern and northern parts of the site, in areas not affected by gravel extraction.
- 5.5.5 The probe holes confirm that disturbance caused by gravel extraction was confined to a central area of the sidings (Appendix A and Fig 5). Archaeological deposits may survive elsewhere. It can also be suggested that the potential exists for the survival of the organic component of archaeological deposits. Undated organic remains were recorded in the probe holes, and these are not necessarily of nineteenth or twentieth century date.

5.6 The Western Edge of the Study Area

- 5.6.1 A variety of buildings, roads, car parks, and open spaces occupy the western edge of the study area (Fig 7). Here it is envisaged that some disturbance to potential archaeological deposits will have occurred. However, it cannot be assumed that all archaeological remains in these areas will have been destroyed.
- 5.6.2 Buildings and roads may not have completely destroyed archaeological remains beneath them.
- 5.6.3 A number of large open spaces still remain in this area. These include the Cowley Road Park and Ride Car Park, part of which lies within the boundary of this planning application, and a field under grass immediately to the north. Field observation suggests that this car park was built by banking upwards rather than by ground reduction.

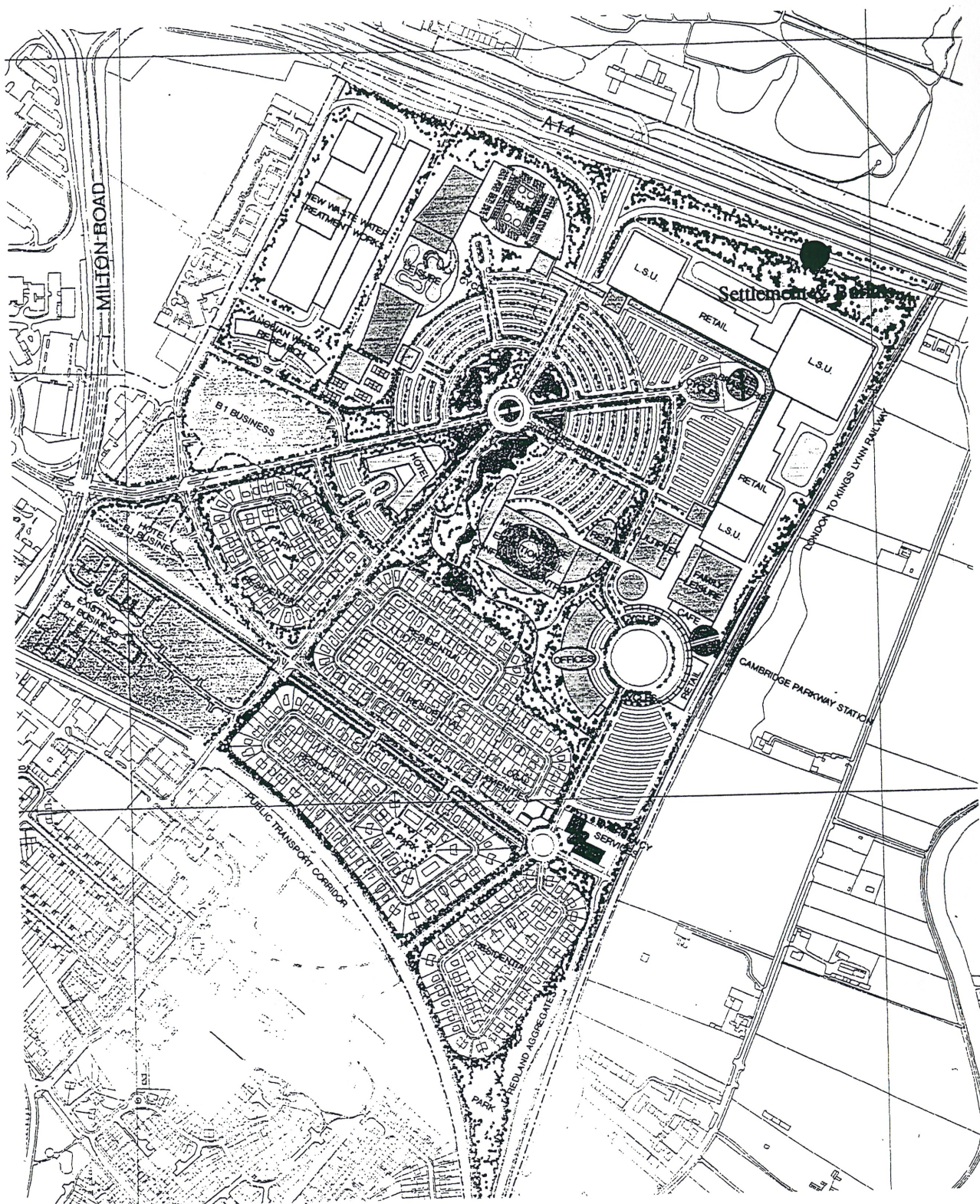


Figure 8 Extract from the Master Plan of Concept Proposals (After Fitzroy Robinson Ltd)

6 THE POTENTIAL IMPACT OF THE PROPOSED DEVELOPMENT

- 6.1 The master plan of 'concept proposals' prepared by Fitzroy Robinson Ltd (Fig 8) shows an extensive development of residential housing, retail outlets, offices, leisure and conference facilities, roads and car parks. An extensive network of underground services must also be envisaged.
- 6.2 The excavation of foundation and services trenches would have a significant impact on any surviving archaeological remains. It is noted that large buildings labelled 'retail' and 'L.S.U.' are planned for the north-eastern corner of the development area, near where an Iron Age / Romano-British settlement and cemetery were disturbed in 1903.
- 6.3 It is likely that deposits such as former sewage sludge would need to be removed down to more solid load bearing strata (Wimpey Environmental 1995), so archaeological remains masked by modern deposits would be threatened.
- 6.4 The development is dense. There is only one substantial area of car parking where the impact of the development could easily be mitigated by the avoidance of ground disturbance.
- 6.5 The development is to be built on land which is widely 'contaminated' when compared with ICRL threshold trigger concentrations for either 'domestic gardens' or 'public open space' (Wimpey Environmental 1995, Soil Mechanics 1996). It seems probable that contamination mitigation strategies involving removal of contaminated ground could have considerable and widespread impact on archaeological deposits even where the development proposals do not indicate the construction of buildings.
- 6.6 Further damage to archaeological deposits can be caused by movement of plant in wet conditions, and by landscaping and planting of trees.
- 6.7 In view of these considerations, the proposed development must be regarded as having a potential impact on any surviving archaeology across the whole of the study area.

7 CONCLUSION: THE ARCHAEOLOGICAL POTENTIAL OF THE STUDY AREA

- 7.1 Because of the rich archaeological background of this part of the Cam Valley, it is thought probable that remains from a variety of periods could exist within the study area.
- 7.2 The cropmarks of ring ditches to the west and north of the study area, c 100m and 300m away, suggest that the gravel terrace may have been the location of funerary monuments during the Bronze Age. Two Bronze Age hoards recorded c 400m to the south-west also indicate the potential importance of the area at this time.
- 7.3 Cropmark evidence, field walking, and trial trenching have indicated a dense pattern of late prehistoric and Romano-British settlement on the gravel terraces north of the study area. Saxon occupation was also present, and may be under-represented by the evidence collected so far.
- 7.4 The discovery of human remains, pits, animal bone, and pottery in 1903 demonstrates that this late prehistoric and Romano-British settlement extended into the study area. The extent of disturbance to these remains is unknown.
- 7.5 Twentieth century landuse means that aerial photography cannot be used to pinpoint any other specific zones of archaeological potential within the study area. It must be recognised that archaeological deposits could occur in most locations across the area.
- 7.6 In contrast, some limited areas can be identified where any archaeological remains may already have been disturbed. These areas are:
- 1) A backfilled ballast pit located within the present railway sidings (Figs 5, 7). Here archaeological remains will definitely have been removed.
 - 2) The areas occupied by the tanks and other installations of the sewage works. Here it is difficult to assess the probable depth of foundations. Many structures will undoubtedly have destroyed any archaeology; some could have more shallow foundations.
 - 3) The twentieth century buildings on the north-western edge of the site, and within the railway sidings. Here again, archaeological remains will probably have been disturbed, but the extent of disturbance is difficult to assess.
- 7.7 Two large areas are excluded from the planning application to which this desktop study relates, but are shown as developed on the master plan of 'Concept Proposals' (Figs 7, 8). These lie to the north and south of Cowley road, immediately to the south-west of the area of this planning application. The field to the south of Cowley Road may be of archaeological potential because cropmarks of unknown date lie within it (Appendix A), and because the field lay

south of the Sewage Farm and has never been developed. Similarly, north of Cowley Road, some development has taken place, but the rest of the land has not been developed since the contraction of the sewage farm.

8 RECOMMENDATIONS

- 8.1 This desktop study has identified the general archaeological potential of the area but, the exact location, date, character, and degree of survival of archaeological remains are yet to be established.
- 8.2 Geophysical survey is not recommended for the railway sidings area because of the depth of modern made ground suggested by the contamination assessment probholes. Its use could be considered in the area of the historic sewage farm, but might again prove problematic. Results might be confused by the variable depths of modern dumping suggested by the Wimpey Environmental trial pits, and by features relating to the 'under drainage' of the sewage farm.
- 8.3 A programme of trial trenching and test pitting using a machine to open linear trenches is recommended as the most appropriate and cost effective strategy to establish specific archaeological characteristics across the study area. The north-eastern part of the study area should be investigated to determine whether parts of the settlement and cemetery disturbed in 1903 survive. The remainder of the study area (with the exception of the backfilled ballast pit), should be sampled where possible to locate further concentrations of archaeological deposits. The extent of modern disturbance would be determined, and the date, character, and degree of preservation of the archaeological remains assessed.
- 8.4 Field evaluation should be considered before the implementation of the mitigation strategies designed to combat the on site contamination. These mitigation strategies could involve considerable disturbance to the archaeological remains. The field evaluation should involve a thorough risk assessment, and use of appropriate personal protective equipment. A preliminary evaluation of the implications of the contamination levels for archaeological excavation is provided in Appendix B.
- 8.5 After field evaluation, the need for archaeological mitigation should be re-assessed.

ACKNOWLEDGEMENTS

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Historic Maps and Documents Consulted

Draft Inclosure Map CRO (Cambridge Record Office) R68/59 nd

Inclosure Map CRO Q Rdc 59

Ordnance Survey, 1889, 1:10560 Map

-----, 1904 1:10,560 Map

-----, 1928, revised 1938 1:10,560 Map

-----, 1925, with additions in 1950 1:10,560 Map

-----, 1959 1:10,560 Map

-----, 1974 1:10,000 Map

Sixteenth and seventeenth century terriers: CRO P40/28/2, CRO P40/25/17, CRO P40/25/16

APPENDIX A AERIAL PHOTOGRAPHIC ASSESSMENT by B.Robinson

Photographic Sources

Cover searches of the subject area and its immediate surroundings were obtained from the Cambridge University Collection of Aerial Photographs (CUCAP), National Monuments Record (NMR) at Swindon, and Cambridgeshire Record Office (CRO).

Photograph Interpretation Methods

Photographs from CUCAP and CRO covering part or all of the subject area (see above), and those within a tolerance strip of c 500m width around the subject area boundaries were examined.

All photographs were examined by eye and under slight magnification by the author. The NMR photographs (with the exception of those duplicated at the CRO) were not examined as part of this assessment; ground conditions over the majority of the site during the aerial photograph coverage period, and the paucity of coverage during generally cropmark productive months of the remainder led to the conclusion that they would add little information to the photographs already viewed.

Mapping of Photographic Features

Digital Ordnance Survey base maps (at 1:1250 and 1:2500) and paper OS maps 1:10,560 and 1:10,000 were used to assist mapping.

Features within the subject area (with the exception of areas of ridge and furrow) were mapped at a scale of 1:2500, features just outside the subject area were mapped at 1:10,000. Areas of plough-flattened ridge and furrow are indicated schematically only.

Plotted features were rectified using AERIAL v. 4.2 software. Average control point errors did not exceed +/- 2.5m.

Background and Air Photographic Context

The subject area falls on the terrace gravels to the west of the river Cam. A thin belt of alluvium which borders the Cam is not mapped within the subject area (Institute of Geological Sciences Sheet 188). Gravel extraction pits in the locality, which are now mostly water-filled, have exposed underlying Gault Clays. The terrace gravels of the Cam and Fen edge north of Cambridge have long been subject to cultivation and only a few patches ancient earthworks survive in the vicinity (principally Roman sites at Horningsea, Chittering and Cottenham). The terrace gravels are extremely cropmark productive, however, where ground conditions permit. Dense cropmark concentrations have been mapped as part of the Fenland Project as far 'inland' as the north boundary of Milton parish and more recently as part of an evaluation for a proposed rowing lake

to the north and east of Milton village (within 300m of the subject area's north boundary). During this evaluation abundant cropmark evidence for Romano-British terrace edge settlement, field systems and trackways was examined by trial trenching and fieldwalking. Whilst the air photographic evidence provided an accurate indication of the extent of the larger buried features across most of the site (even where sealing alluvial deposits survived), an area of substantial Anglo-Saxon and Roman settlement features to the south of Waterbeach did not register on any of the examined photographs (Robinson and Guttman 1996, Palmer 1996) and have not been seen under favourable circumstances since 1995 (Robinson, pers. obs.).

Land Use

Ground conditions within the subject area have reflected its location within the urban fringe of Cambridge. The establishment of the sewage farm and railway sidings both pre-date the earliest known aerial photograph of the area (RAF 106G/UK 1490 9/MAY/46 3328-3329 - a very poor copy at CRO). The sewage works and settling beds have occupied the northernmost two thirds of the subject area and the railway sidings have occupied its south-east corner. Since the mid 1970s an agricultural machinery sales compound has occupied a large site in the south-west corner of the subject area. Cultivated land (where aerial photographic evidence is likely to be most readily discerned) has been confined to three or four fields in the south-central part of the subject area.

Interpretation

Water-filled pits are seen on RAF CPE/UK/1952 25 MARCH '47 1087. That these are something more than a product of the infamous 1947 floods is apparent on photographs taken during September of that year (RAF CPE/UK/2302 10 SEPT '47 6019). All but the northernmost pit has been back-filled by 1949 (Fairey Jun-Aug 1949 200685). This pit is also seen in 1952 (RAF 58/866: 30 APR '52 6019) but has been back-filled by 1974 (RC 8 AQ 227).

Soilmarks and the slight earthworks of ploughed-down ridge and furrow are apparent in the southern part of the subject area and its bordering fields in many vertical photographs (see below).

Cropmark features (which have been partially covered by the new Milton Road, and by subsequent industrial buildings) immediately to the west of the sewage treatment works (TL 470 617) were formally recorded as SMR 8326 and 8330. The 1:10,560 SMR map has displaced the cropmarks to the field to the north and rotated them anticlockwise through 90 degrees; the correct location is shown on Figure 7. The positive cropmarks indicate a modern pipeline or field drain (partially flattened crop); a single univallate annular feature of c 30m diameter (probably a ploughed-down round barrow); probable frost cracks; and two parallel linear features which pass through the probable barrow (probably a double-ditched boundary, or ditched-bordered trackway). The latter, although not recorded in the subject area, may nevertheless extend into its west margin. This evidence was mapped from oblique photograph BVQ-075.

Positive cropmark features were also noted in the field bordering the subject area to the south (TL 472 611). These indicate two slightly divergent linear features (? field drains) which are roughly perpendicular to the line of modern field boundaries; two sides of a ?rectilinear enclosure showing as a positive cropmark in 1977 (CCO - 051) and as a negative cropmark in 1974 (RC8 AQ 227); and a short length of linear feature which parallels the east side of the possible enclosure.

Discussion

It is interesting to note that the two cropmark clusters recorded adjacent to the subject area are within areas where ridge and furrow has been observed on earlier photographs, or where its former presence can be inferred. This is consistent with the 'weathering-out' of early cropmark features observed on former ridge and furrow areas in west Cambridgeshire and Huntingdonshire. Elsewhere modern disturbance and the deposition of sewage has served to mask any present archaeological remains.

Aerial Photographs Examined

* indicates most informative, ** indicates used for mapping (frame no. in brackets)

CUCAP

Oblique

YW 36-37	23/6/59	*	
ZQ 67-68	4/7/59	TL 474 607	** (67)
BVQ 74-76	11/8/75	TL 470 617	** (75)
CCO 50-51	6/7/77	TL 475 615	** (51)
CLJ 59-82	16/1/80		
CPM 1-1, 6-7	25/5/82		
CQV 19	9/7/86		
70 Kn BE 41-44	8/6/88		
70 Kn JF 25-32	18/11/91		

Vertical

RC8 AQ 226-227	8/7/74	TL 474 607	** (227)
RC8 FD 190	23/2/83		
RC8 IM 155-161, 173-179, 208-214, 225-230	30/4/86	*	
RC8 Kn CS 117			

CRO

Vertical

RAF 106G/UK 1490 9/MAY/46 F20/540 SQDN	3328-3329	
RAF CPE/UK/1952 25 MARCH '47 Fl20"//Multi(4) 58 SQDN	1086-1087	*
RAF CPE/UK/2302 10 SEPT '47 f/14"//5,600 58 SQDN	5222-5224	*
RAF 58/866: 30 APR '52. F 10"/RESTRICTED	6017-6020	*
RAF F.21.540 RAF 1143. 9.JUN 53 = 15.30z.20" 16.666'062-063,0149-0150		

FAIREY Jun-Aug 1949	200683-200685	*
BKS 1962 32866-32868	(summer)	*
MERIDIAN 22/JULY 1969	70 69, 152-154 1030-1032	*

NLAP (Not examined)

Specialist collection - 30 records.

Verticals - 25 sorties (219 prints).

APPENDIX B THE IMPLICATIONS OF THE GROUND CONTAMINATION FOR ARCHAEOLOGICAL EXCAVATION

Saba Ala'i CCC Property Dept Health and Safety Advisor

***Precautions: You should be protected against most of the substances identified in the Wimpey and Soil Mechanics reports if you wear:**

- impervious gloves, which are regularly washed out and dried
- rubber boots or other impervious footwear that can be hosed down to prevent taking contaminated soil into cars etc
- disposable face masks for use against dusts, if any area is particularly dusty
- goggles, for use in particularly contaminated areas (see the soil reports and ask for maps of where samples were taken)

*** You should also do the following:**

- find out if the pesticide spraying is still done, and avoid the railway siding at that time and for a few days after ;
- have your own clean water on site for washing as well as drinking, or find a suitable source (not fed from the boreholes). Also find out how the ground water and borehole water is contaminated;
- make sure all staff know of the level of hazard and precautions;
- ask the site owner to do Carbon Dioxide tests, as required in the report, or hire an external CO2 monitor, of the type used in confined spaces;
- decide if you really need to excavate the organic fill areas, where the most risks seem to be;
- find out if the proposed landfill gas monitoring during 'fieldwork' (item 5.1 of the Soil Mechanics report) could start when you start work;
- find out if any staff have particular allergies that could be affected by the site;
- make sure you have all the hazard assessments referred to in section 6 of the Soil Mechanics report, and you are told what a BDA 'yellow' classification means.
- further information from and discussion with the contractors who carried out the initial contamination assessments is a possible need.
- was the site used for anything else prior to being a sewage farm and railway siding? In particular, were there any more contaminating industries (e.g. tannery) that might have been missed by the sampling? If so, you need to know, but the general precautions above should cover you.
- bore hole water contamination could indicate that it is unfit for drinking, not that it is unsafe to touch. You should be told how contaminated the water is, but can get round the issue by taking your own water for all uses (drinking, washing, etc) on to site or using another known safe source nearby, and wearing gloves.



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