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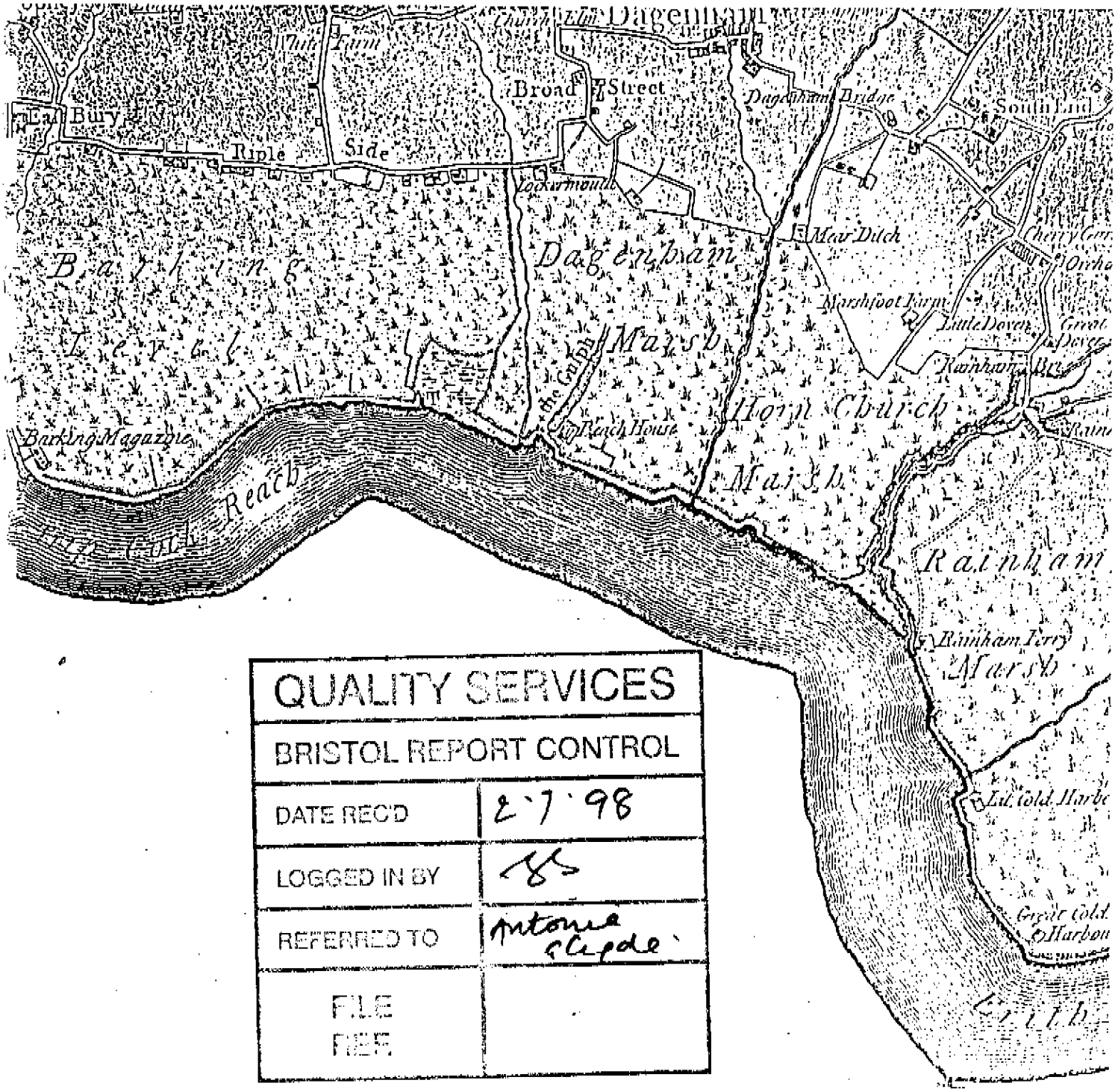
A 13 IMPROVEMENTS: DAGENHAM HEATHWAY TO WENNINGTON

ARCHAEOLOGICAL SURVEY



Passmore Edwards Museum

NEWHAM MUSEUM SERVICES

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Fig. 1. A13 Improvement, Dagenham Heathway to Wennington Route and Archaeological Sites (List of Sites in Appendix 1)

Fig. 2. Chapman and Andre's Map of Essex 1777, excerpt (also cover)

Fig. 3. Part of the Ordnance Survey 6": 1 mile map, 1869-70, reduced to 70%

Fig. 4. The Dagenham Idol

A13 IMPROVEMENTS: DAGENHAM HEATHWAY TO WENNINGTON

ARCHAEOLOGICAL SURVEY

1. SUMMARY

The A 13 Improvements from Dagenham Heathway to Wennington cut through an important zone for the study of the archaeology and ancient environment of the lower Thames valley, and particularly of the valley floor.

The desk-top study and field survey have identified some important areas of archaeological interest or potential along the route. The major areas are the gravel terrace, the zone where the terrace slopes down and where it is blanketed by alluvium and the peat beds.

The area now beneath and on the edge of the alluvium is where there is the likelihood of prehistoric and Roman settlement, particularly that of Mesolithic and Neolithic. The peat beds, exposed during regressions, may contain evidence of human activity. Activity of all periods, especially that associated with rivers and wetlands, is also highly likely.

This zone is also important for the study of sea-level changes (the transgressions and regressions), for the history of the lower Thames and for the vegetational sequence of the valley floor. Where the underlying gravel terrace rises up there may be a sequence of prehistoric shorelines surviving underneath the alluvium. Water-logged conditions are favourable for the preservation of organic materials and some types of archaeological site may still be preserved in superb condition.

Areas where archaeological work will be necessary in these and other zones are described in section 8. Environmental archaeology is discussed in appendix 2, section 11.

2. INTRODUCTION

2.1 The construction of the A 13 Improvements will result in a swathe of land, some 100m wide and 11km long from Dagenham Heathway to the Mardyke being developed (Fig. 1). This route passes through a relatively undeveloped area in the largely marshy zone alongside the river Thames in the London Boroughs of Barking & Dagenham and Havering and then into Aveley in the county of Essex. The Passmore Edwards Museum, have been contracted by the Department of Transport, to conduct a desk-top study and fieldwalking survey on the part of the route from Dagenham to Wennington in order to identify areas of archaeological potential before the works commence. A great part of this section of the route is through the Thames marshlands; the last part lies on the drier gravel terrace.

2.2 The desk-top study involved looking at maps of various dates, airphotographs of some areas, the Department of Transport borehole summaries, published histories of the area and at records in the Passmore Edwards Museum.

2.3 The fieldwalking survey was carried out during October 1992 along selected parts of the route where conditions allowed (section 4).

2.4 The sections of the route were divided up with reference to definable parcels of land/landowners and the chainage on the engineers' plans. Site codes and accession numbers were then allocated.

2.5 The final section of this study ends where the road route enters a cutting just west of the county boundary. Here the survey by the Essex County Council's Archaeology Section begins.

2.6 Archaeological sites and areas mentioned in the text, where marked on the map (Fig. 1) and listed in appendix 1, are identified by numbers in brackets, for example the Dagenham Idol (2).

3. ARCHAEOLOGICAL BACKGROUND

3.1 Geology, Topography and Landuse

3.1.1 The Marshes

The road route traverses the low-lying, flat marshland fringing the north bank of the Thames. According to the British Geological Survey (BGS (1978) sheet 237, 1: 50000) the drift geology comprises Alluvium which overlies variously Woolwich and Reading Beds, Thanet Beds and London Clay. The Alluvium contains beds of peat.

The very low-lying area, just south of the present A13 trunk road where the Dagenham Breach and the Havering Gulf formed may represent a former channel of the Thames. Islands of higher ground in the marshes, for example Frog Island and Coldharbour are still obvious today. Others may be buried under the blanket of alluvium.

The land is ill-drained and water-logged, though drainage schemes have been carried out over several centuries and especially since the 17th century (Victoria County History VII (1978) 134 (VCH)). Until the recent past the land was used for rough grazing; today the final western section of the road route is occupied by various industries, a sewage works, rifle ranges and silt-lagoons. Rough grazing is still carried out in a few areas. Chapman and Andre's map (Fig. 2) shows the situation in the mid-late 18th century; the situation has barely changed 100 years or so later (Fig. 3).

Airphotographs (sections 3.3.5 and 6.2) show various dried up and silted up river and stream courses and drains, probably representing changes over many centuries. Some of the linear cropmarks may be of earlier drainage schemes.

3.1.2 The Gravel Terrace

The A13 Improvement route crosses the gravel terrace, in this case the Flood Plain Terrace (Terrace 1) in two areas BGS map sheet 237 and D of T Borehole Survey).

Firstly, where it leaves the present A13 by Goresbrook and passes onto the Alluvium by the Ford Motor Works and Barking Power Station, a small swathe of the gravel terrace is affected.

Secondly, the route passes over the interface between the alluvium and gravel terrace east of Wennington. The area traversed by the fieldwalking rises where the alluvium meets the gravel terrace, forming a noticeable bluff on the ground to the river side of Wennington (VCH VII (1978),180); this interface also shows clearly on airphotographs.

Deep cuttings and piles will also cut into the gravel terrace where it is buried under alluvium. These terrace lands have long been favoured for arable cultivation and market-gardening, the latter flourishing particularly from c.1900 to the 1930s (VCH VII (1978) 134-135). Gravel-winning has taken up more and more land since 1930. Grazing in Rainham effectively ceased with the sale of the last herd by 1974 (VCH VII (1978) 136; W.Vellacott, pers. comm.). The land between East Hall Farm and Ponds Farm is still used for rough grazing and is not cultivated.

3.2 Archaeology (Fig. 1 and Appendix 1 section 10)

3.2.1 Prehistoric

The earliest finds in the area are of palaeolithic hand-axes and flakes which are generally recovered during gravel quarrying. None of these can be shown to have been found in situ; they are usually stained and rolled and from reworked terrace gravels. It is clear from Wymer's analysis of this part of the lower Thames that there was much movement of the river especially in the earlier part of the Ice Age (Wymer (1985) 304 ff)

A single site with fossil elephant and mammoth remains was excavated in a pit in Sandy Lane, Aveley; there was no evidence of human activity (Wymer (1985) 303). This area lies in an old buried channel of the Thames which ran northwards from Aveley to Belhus Woods (Wymer (1985) 319).

The Mesolithic period is ill-represented, there being a few implements from Brookway in Rainham (15) and Great Arnold's Field, Launders Lane, Rainham (22), both archaeological excavations. A couple of stray Mesolithic flint implements were found near Willow Cottages, Wennington (35) (Wymer (1977)189). Mesolithic sites are likely to be found along the edges of earlier courses of the Thames.

Evidence for the Neolithic is confined to to a few stray finds and to two major sites close to the road route. One lying on the edge of the gravel terrace and into the marsh at Brookway, Rainham (15) has produced traces of an early Neolithic settlement. This site is

just north of the Silt Lagoons. The other, a ring-ditch with a central pit,first identified from cropmarks, was excavated prior to gravel extraction in 1963 at Great Arnold's Field, Launders Lane (22). Material found included finds of the early and late Neolithic and some Beaker pottery.

A carved wooden figurine, known as the Dagenham Idol(2) (and cover), recovered from the Dagenham marshes close to Ford's Motorworks, has been recently dated to the later part of the Neolithic,in the range 2351-2139 BC. (Coles, 1990). Although a deer skeleton was found nearby (Wright (1923), there could well be no relationship between the two items.

Work by Tony Wilkinson in the Purfleet marshes has identified the remains of a submerged forest, dated to the Neolithic, close to the mouth of the Mardyke (Wilkinson, T and Murphy (1987) 8ff). There are local reports of deeply buried trees in the Dagenham marshes (Frank Lewis,Notebooks); these are undated.

A late Neolithic flint arrowhead and a probable early Neolithic core rejuventation flake were retrieved during a site visit to the Goresbrook Leisure Centre when it was being constructed (1). There may have been a prehistoric site here on the edge of the gravel terrace, but the two objects could have been dropped by neolithic passers by. Neolithic sites and finds on the fringe of the present marshlands and within them point to the possibility of further sites being found in these areas.

More sites are known to date to the Bronze Age. Finds have been made at Gerpins Pit (early) (28) and the Jewish Federation Cemetery (middle) (24). A possible late Bronze Age cremation cemetery with slight barrows was excavated on the east side of Launders Lane (25) (Greenwood (1982)). There is evidence for late Bronze Age - early Iron Age settlement further up the terrace at Hunts Hill Farm, Upminster (Passmore Edwards Museum excavations 1990-) and at Whitehall Wood (Greenwood (1986)). Bronze Age sites are also likely to be found on the other parts of the gravel terrace.

A wooden trackway was constructed at some stage in the Bronze Age at Bridge Road, Rainham, leading into the marshes (12) (Meddens and Beasley (1990)). This discovery highlights the possibility of other such trackways and remains of waterside and water-related activities of all periods being found.

The Iron Age is the best represented prehistoric period in the area. Those sites and finds nearest to the A 13 Improvement route are the late Iron Age hillfort at Moor

Hall Farm, Rainham (25) (Greenwood, (1982)), quantities of late Iron Age pottery from the Jewish Federation Cemetery (24)(Passmore Edwards Museum Collections), an early and possibly middle Iron Age settlement at Hunts Hill Farm and an early, middle and late Iron Age settlement at Moor Hall Farm pit in Aveley (Barton (1959)).

So far, Iron Age sites have not been located in the present marshlands. This may reflect either a Bronze Age-Iron Age trend towards placing settlements further up the gravel terrace, perhaps in response to a transgression of the Thames, or that sites are buried under alluvium.

3.2.2 Roman

Roman sites are perhaps the best known along the route. Roman pottery has been found near the mouth of the Ingrebourne in Ferry Lane, Rainham (13) (Lewis (1966) 4). Two marshside sites have been excavated, at Bridge Road in Rainham village (12) (Meddens and Beasley (1990)) and Brookway, Rainham (15), adjacent to the railway and Silt Lagoons (Passmore Edwards Museum excavations 1992).

On the gravel terrace, Roman finds include several flagons and a cremation burial from Gerpins Pit, (28) (Evison (1955); Passmore Edwards Museum Collections), pottery including complete vessels from the Jewish Federation Cemetery (24) (Passmore Edwards Museum Collections) and a complete flagon and terra sigillata from Ayletts Farm, Warwick Lane (some material in the Passmore Edwards Museum Collections) , all in Rainham. Roman material was also recovered from the pit by Moor Hall Farmhouse in Aveley (Barton (1959)).

An extensive farmyard area and fields were excavated at Moor Hall Farm on the east side of Launders Lane (25)(Greenwood (1982)); cropmarks on the west side indicate that the site continued much further westwards (27). Hunts Hill Farm, Upminster (Passmore Edwards Museum excavations 1990-), lying further north-east, is clearly a major Roman site, the outlying parts of which are currently being investigated. A rectilinear cropmark with a possible structure may form the main part of the Roman evidence.

The Roman pottery from the Beam river area (6) has now been traced to water company works further upstream (Passmore Edwards Museum records). To the south is a Roman settlement in the Mardyke Estate (7) with a cemetery (8) a little further east (Lewis (1966) 3).

This pair of sites, coupled with those at Brookway and Bridge Road, Rainham, form a line of Roman sites along the 5m contour, fringing the marsh along an earlier edge of the gravel terrace on each side of modern Rainham. Further sites are likely to be found along this line.

Roman sites, too, are most common on the gravel terraces, but the finds and features from Rainham creekmouth and the Brookway site indicate that there was activity at the very least in the area that is now marshland. A port on the Ingrebourne or at its mouth as in the medieval period is a possibility. Interestingly, the place-name Coldharbour is indicative of Roman settlement (Jermy, (1992) (Fig. (2). There is as yet no evidence for any Roman roads which would have been necessary to service the Roman settlements.

3.2.3 Saxon and Medieval

Evidence for the Saxon period is sparse, though clearly there were Saxon settlements at Rainham and Wennington judging by place-name evidence.

Gerpins Pit (28), Rainham was the findspot of a nationally famous pagan Saxon cemetery with rich finds (Evison (1955)). The site was not investigated by archaeologists and its full extent is not recorded; it may have extended as far as Warwick Lane. No related settlement has yet been located.

Medieval settlement comprises the villages of Rainham (11) and Wennington (36) and a number of manors and farmsteads. The location of the manors of Rainham and Launders is not known precisely. Launders is likely to be somewhere off Launders Lane. South Hall farm (18) is the site of the manor of South Hall, for which a watermill is also recorded in 1270 (VCH VII (1978) 133-134), presumably on the Common Sewer.

Wennington Hall (31) held 523 acres, mainly marshland (VCH VII (1978) 182). The manor of Noak/Noke (34) lay to the east of Wennington village.

Two medieval farmsteads have been archaeologically excavated, one on the south-eastern side of Great Arnold's Field, Launders Lane (22) (excavations by Smith and Simpson in 1963) and the other at Brookway (15), both Rainham. They raise the possibility of other such sites being found.

A medieval wharf, with post-medieval and modern additions, is recorded on the Ingrebourne on the western edge of Rainham village in 1526 (10) (VCH (VII (1978)

136). Wennington too had its own wharf (29) while the creek remained navigable. The brook feeding it was diverted in the 17th century causing the creek to be occluded (VCH VII (1978) 180).

3.2.4 Post-medieval and modern

A post-medieval house stood by Manor Way close to the road route (9). A few recent, isolated houses are sited by the marsh edge. Hamlets occur in the marshes on pieces of higher ground by the river's edge as at Rainham Ferry and Coldharbour.

Rainham wharf expanded in the post-medieval period and it is thought that there was shipbuilding in the creek during the 16th century (VCH VII (1978) 136). Wennington wharf however closed when the creek silted up and the saltmarshes were reclaimed in the 17th century.

A street from Wennington to Purfleet is first recorded in 1345 and 1413. The Royal Ordnance Road to Purfleet grew out of a secondary and more direct route via Noak House in the 1760s; part of this is overlain by the present A 13 trunk road (VCH VII (1978) 181).

The Noak/Noke House was converted in c. 1808 into a joint workhouse shared by the parishes of Aveley, Rainham and West Thurrock (VCH VII (1978) 185).

A plague pit is reputed to have been found when a later stage of the Fords Motorworks was built on the Hornchurch marshes (5) (Frank Lewis,Notebooks 3).

Once the marshes were brought under control and the Dagenham Breach and the Havering Gulf (both the result of flooding in the Fords Motorworks area) reduced, the marshes became more usable. Three seventeenth-century ships (Government ships) were used as landfill to dam the Dagenham Breach in 1710. In the last 100 years or so the marshes have become increasingly built-up.

3.2.5 Undated cropmarks

There are a large number of cropmarks recorded on the gravel terraces, some of which are extensive. In general the gaps or abserces in the cropmarks mirror the pattern of gravel extraction. Known cropmarks do not necessarily show up or appear clearly every time the area has been flown.

Cropmarks fringe the route of the road from South Hallfarm northwards. Undated enclosures are recorded beside the A13 (16), whereas the cropmarks by Spring

Farm and the Jewish Federation Cemetery (24) are not very clear and may be partly masked by geological features. Both sides of Launders Lane produced extensive cropmarks, long since destroyed, but with a large part of the area archaeologically excavated (24, 25 and 27).

Several enclosures or ring-ditches, again undated, are visible on the north side of the new route to the north of Noak House (33). These may be ploughed out neolithic or bronze age barrows. There are also a few linear features on this part of the gravel terrace. These may be drains as are many of the cropmarks visible in the marshes.

Current and previous archaeological work by the Passmore Edwards Museum in this area has shown that, although the cropmarks always indicate archaeological sites, not all archaeological features have produced cropmarks and some only do so periodically. Some 'blank' or sparsely represented areas have yielded much evidence, for example the late Bronze Age settlement at Hunts Hill Farm (Passmore Edwards Museum 1990-) and the Roman farmyard at Moor Hall Farm, Rainham (25). No cropmarks had been recorded, for example, for the early Iron Age and Roman settlement at Manor Farm, North Ockendon (a site which extended southwards to Dennises Lane) (Passmore Edwards Museum excavations).

4. FIELDWALKING SURVEY

4.1 Methodology

Our methodology was designed to be compatible with similar fieldwalking projects being undertaken by the neighbouring Essex County Council Archaeological Section. For this project, the accessible areas of the route were gridded up into 20m squares, in a swathe 100m wide, using ranging rods and bamboo canes. The western edge of each square was then fieldwalked resulting in 25 transects in each hectare, allowing a 10% sample. Using the chainage marked on the plans provided, each transect was numbered, for example 1.1.A, the first transect in the first hectare of the second kilometre. Along each transect any finds and surface observations were made and recorded as appropriate on pro-forma sheets.

4.2 The Route

4.2.1 Introduction

In the area covered by the Passmore Edwards Museum, the proposed improvements involve the "development" of a swathe of land from Ripple Road , adjacent to the Goresbrook Sports Centre, around the back of Ford's Motor Works to the south, crossing Chequers Lane, Kent Avenue, Thames Avenue, Manor Way, Rainham Creek, Ferry Lane, over Rainham and Wennington Marshes to London Road. The area concerned involves four interchanges, two link roads, an amount of shrub planting as acoustic barriers and a length of 8.2 km of dual three lane carriageway, partially elevated on viaducts and embankments and partially at ground level.

None of route was ploughed and indeed much of it was inaccessible due to buildings or concreted areas and natural obstructions like marsh drains and dense vegetation.

4.2.2 Goresbrook Sports Centre to Ripple Road Interchange - km 1

The route heads east and then turns east-north-east and will effect the existing A13, other minor roads, a number of factories and warehouses and concrete covered areas and a car park. This km was not suited to finds retrieval and no further surface features were observed.

4.2.3 Ripple Road Interchange to Kent Avenue - km 1 to km 2

The route heads south-east then east and will effect a

number of factory/warehouse units, a concrete covered car compound, the back of Ford's Motor Works and Dagenham Dock Railway station. This km was also not suited to artefact retrieval and no further surface features were observed.

4.2.4 Kent Avenue to Thames Avenue - km 2 to km 3

The route heads east and passes over Dagenham Breach, an open stretch of water with grassed over banks and adjacent industrial units. Again this portion was not suited to artefact retrieval and no further surface observations were made.

4.2.5 Thames Avenue to Manor Way - km 3 to km 4 and link roads

The route heads east and rises over the back of Ford's Motor Works and land used for dumping and slag heaps, with a road and canalised marsh drain. None of this area was suited to artefact retrieval and no further surface observations were made. The northern link road to New Road goes over the back of Ford's and a car compound. The southern link road to Fairview Estate similarly is over raised industrial ground. Nothing was found or observed in these areas either.

4.2.6 Manor Way to Ferry Lane Interchange - km 4 to km 5

The route heads south-east and crosses Rainham Creek and then across a container yard with concrete foundations. The banks of the creek are heavily overgrown. Subsequently this portion of the route was also not suited to artefact retrieval and no further surface observations were made.

4.2.7 Ferry Lane to The Silt Lagoons - km 5 to km 6

The route heads east south east across Rainham Marsh, which is largely inaccessible with wide drains and thick vegetation cover. The Silt Lagoons are man-made embankments created in the 1960s and cover any potential archaeology. In this section of the marshes nothing was observed and it was not suited to artefact retrieval.

4.2.8 Silt Lagoons to London/Tilbury Railway - km 6 to km 7

The route heads south-east and crosses the Purfleet Rifle Range. However the area is covered with tussock grass and criss-crossed by marsh drains. A single dry linear depression was observed at 6.9 km along the route, which is probably the remains of the Wennington

Creek, which silted up some time after 1600. No further surface observations were made and the ground was not suited for artefact retrieval.

4.2.9 London/Tilbury Railway to the A13 Interchange - km 7 to km 8.2

The route heads east across Wennington Marsh. At the time of our survey most of this area was under a considerable depth of rainwater. However the area available to us was entirely under pasture and enclosed by marsh drains. There was some evidence of differential growth of grass, indicating probable redundant watercourses. This area, though, is very close to the edge of the gravel terrace and many of the traces may be connected with settlement patterns further to the north and east, particularly the circular cropmarks and Wennington village and Manor, both mentioned in the Domesday Survey. The condition of the ground was not condusive to artefact retrieval and no further surface observations were made.

4.3 Results

Due to the extent of existing houses, factories, warehouses and either artificially landscaped or concreted over areas, much of the route was not suited to artefactual fieldwalking. Those areas in open land were all either made inaccessible by marsh drains or unobservable by dense vegetation. No significant artefacts were recovered and no new potential archaeological sites were identified.

5. THE BOREHOLE REPORT

5.1 Introduction

The borehole data were supplied in the form of summary sections produced by Acer Consultants Limited. These have been examined by James Rackham of the Museum of London Archaeological Service who has produced the comments in Appendix 2 (section 11).

5.2 Results

The borehole data for the A13 Improvements were compared with those from an auger survey conducted by the Passmore Edwards Museum. Areas for consideration for fieldwork and for environmental study can be seen from borehole results. Of particular interest are areas with one or more peat deposit sequences and where there is the interface between the rising gravel terrace and the alluvium (see sections 3, 6, 7, 8 and 11).

6. DISCUSSION OF THE RESULTS IN THE LOCAL ARCHAEOLOGICAL CONTEXT

6.1 Introduction

A number of sources of information were consulted ranging from Ordnance Survey maps and early maps (Figs. 2 and 3) and airphotographs to borehole data. Some fieldwork, a fieldwalking survey, was conducted where conditions allowed (section 4).

Flood plains are notoriously intractable to normal archaeological survey methods as stated by Darvill (1987, 76), 'Selecting sites of national importance is especially difficult for rivers, lakes, and alluvium spreads, because waterbound sites and buried landscapes cannot easily be assessed using conventional archaeological techniques.' Excavation in such areas with waterlogging can also present difficulties and the nature of the sites and finds can mean that they are usually relatively expensive.

The results of the examination of the various sources and the fieldwalking are discussed below.

6.2 Airphotographs

A selection of airphotographs in the Passmore Edwards Museum Collections covering the marshes and adjacent areas were examined. Cropmarks were visible on a number of gravel terrace sites - South Hall Farm, East Hall Farm and by the county boundary east of Wennington (Appendix I, nos 16, 19, 20 and 33). These seem to show archaeological features such as ditches or field systems and ring-ditches. Cropmarks on the marshlands on the otherhand show earlier stream beds and probable drains.

The air photographs reveal cropmarks as to be expected on the gravel terrace zone which is already known to be rich in archaeology. For the marshlands, the cropmarks appear to show mainly natural features and the palimpsest of drainage systems covering the last few centuries. Ancient sites are apparently not visible but this is to be expected if they are blanketed by alluvium.

6.3 Boreholes

Although the borehole survey did not locate any archaeological sites (it was not conducted for this purpose or with an archaeologist present), it does indicate important peat deposits which are significant both for environmental archaeology and as potential

areas for wetland activities in the past. These alluvium and peat deposits have been studied the edge of the marsh/Ingrebourne at Rainham village (12) (Meddens and Beasley (1990)) and have been recently sampled at Ferry Lane (14) and Brookway (15), Rainham where there are archaeological deposits ranging from the early Neolithic to medieval period.

A further study of the valley floor deposits was carried out during an auger survey of the proposed Horndon-Barking gaspipeline route covering the section from Ford's Motorworks to Rainham Silt Lagoons. This survey was conducted by the Passmore Edwards Museum for Wessex Archaeology who are acting for Pencol. Peat deposits were also located by the auger survey which produced similar results to those of the Department of Transport borehole sections.

The waterlogged deposits encountered during the auger survey were only examined to a depth of approximately 2m. Work at Brookway (15) has shown that this is the level where the peat deposits with Roman and Neolithic material have occurred.

6.3.1 The Valley Floor

Elsewhere in London, further upstream, archaeological sites have been found in the alluvium just below and just above Ordnance Datum, for example the cooking pit and Bronze Age ard marks at Phoenix Wharf and the prehistoric deposits at Courages Brewery, Bermondsey (James Rackham by personal communication; Merriman, 1991). Timber dated to the early Iron Age, c. 590 BC, were recorded at depth of 1.4 m OD at Richmond Terrace, Westminster (Andrews and Merriman, 1986).

In Kingston-upon-Thames work over the last three decades has revealed major waterlogged prehistoric remains dating from the Neolithic to the Iron Age in an earlier channel of the Thames (Sargeantson, Field, Penn and Shipley, 1991-1992). In this case archaeological work had been carried out to a sufficient depth to locate the remains which might ordinarily not have happened. The Kingston site is a salutary reminder that deposits that appear 'natural' such as alluvium may simply be flood material which has buried earlier sites. These authors state that in the flood plain 'there is no such thing as 'natural', something that has only been appreciated in London as a whole in the last decade'(loc. cit).

Neolithic riverside sites have been discovered by chance at Kingston, Twickenham and Runnymede buried under alluvium and associated with earlier, filled-in river

channels (Field and Cotton (1987), 77, 95). Mesolithic sites are also likely to be buried under such deposits (Ellaby (1987) 57).

Over the last 10, 000 years the sea level has risen some 20m, though with five periods of reversal of this process called regressions (Devoy (1980); Tyers (1988). More recent human activity will have had its effect, particularly since the drainage programmes and other interferences with the river systems of medieval and later periods. A result of this rise in sea level will be the burying under alluvium of prehistoric and possibly Roman sites and their associated landscapes where flooding has affected earlier dry land.

These sites will be preserved within their landscapes and any occupation debris will be largely intact without disturbance from later human activity such as ploughing, though many will probably have suffered from weathering and decay before being buried. Unless there were waterlogged deposits on the original site, preservation of wood and other organics will not necessarily be good.

Bronze Age barrows were often constructed on flood plains, perhaps because these areas contain damp, marginal land; in this case barrows will survive protected by later alluvium (Needham (1987) 133). Sizeable barrow cemeteries are being found in the Fens emerging as the peat shrinks. 'Any such barrows under the alluvium of the Thames are likely to be superbly preserved, rich in environmental evidence and quite undespoiled' (Needham, loc. cit).

Apart from present river and streambeds, former channels of the Thames and its tributaries may be encountered by the route of the A 13 and its allied works. Studies in the middle Thames by Penn and Rolls (1981) and by Nunn (1983) point to there being shifts in the course of the Thames during the Flandrian, in part at least associated with changes in sea-level relating to the various transgressions and regressions. In the Pleistocene too, there is evidence for changes in course, braided streams and material eroded and deposited (Wymer (1985). The Dagenham Breach and Havering Gulf may be earlier channels and the works in this area may provide valuable data.

There is potential for the study of the biological and sedimentary evidence, and therefore changes in landscape and vegetation, of the transgressions and regressions of the Thames and the changing effect on human activity and of the prehistoric and later shorelines. Proposals have already been submitted (and approved) for specific sites where archaeoenvironmental work is already known to be necessary from borehole

evidence (appendix 2, section 11).

6.3.2 Wetland Use in the past

The A13 Improvement route may also encounter evidence for wetland activities such as water transport, boat-building, fishtraps, waterfronts and wooden trackways. There may also be environmental, dietary and economic evidence in the form of the remains of game, wildfowl, shellfish and plants - wetlands are an extremely rich source of food and were well exploited in the past.

Further upstream, from the City to about Kingston-upon-Thames, there have been varying quantities of prehistoric objects recovered from the river, particularly of the Bronze and Iron Ages, which may represent votive offerings, eroded riverside settlements, crossing points and the like. Given the prestigious nature of many of the objects the votive interpretation is usually favoured (see arguments in Fitzpatrick (1984) for example). Some areas with lesser concentrations and more mundane objects may represent settlements, for example at Syon Reach (Needham and Burgess (1980) 456). The late Neolithic Dagenham idol (2) (Coles (1990)) may be an example of a votive practice in this part of the Thames valley. Unlike the upstream reaches, however, this stretch of the Thames has a large and wide band of alluvium covering the lowest part of the valley. Here such sites and finds may be buried.

The route of the A13 may cut through such a zone and provide an opportunity to study such discoveries as archaeological sites rather than stray finds. The Bronze Age wooden trackway at Bridge Road (12) (Meddens and Beasley (1990)), the medieval and post-medieval wharf (10) and the probable shipbuilding at Rainham suggest some of the types of archaeological remains that the road route may encounter when it cuts through the marshlands and crosses the creeks. Organic material from such sites will in all probability be well preserved. Beaver dams, of archaeoenvironmental interest, might also be found.

Where the route crosses the boundary zone between the marsh and the gravel terrace there may be marsh-edge sites such as the early Neolithic and early medieval settlements and Roman activity encountered at Brookway, Rainham (15). Waterlogged wood and plant remains were recovered from Brookway. Mesolithic marshside/riverside settlements are likely alongside the earlier edges of the Thames.

6.4 The Fieldwalking

Fieldwalking was carried out through an area generally known to be rich in archaeology, with evidence from cropmarks, stray finds and archaeological excavations (see Fig. 1). However, the line of the A 13 Improvement did not contain any arable land, so only topographic features outside the built-up areas could be recorded.

This area has long been used for pasture which does not disturb the deposits below, unlike deep-ploughing. Where there has only been shallow ploughing and marketgardening, experience of other archaeological sites on this part of the gravel terraces has shown that there can be very few archaeological artefacts on the ploughsoil surface. However, there can be abundant archaeology underneath, as for example for the multi-period sites at Moor Hall Farm, Launders Lane (25) and Great Sunnings Farm (Passmore Edwards Museum excavations). Further north, near Romford, although regular walking over ploughed land around the excavation trenches on an early Iron Age hillfort recovered no artefacts, some 0.35m below the surface there were abundant, often large sherds of pottery on the surfaces of the defensive ditch.

As the area fieldwalked was grazing land, and has not produced much provable evidence of ancient activity, care and provision must be made for archaeological sites to be found 'unexpectedly'. Again, experience has shown that in this area of the gravel terrace most developments uncover archaeological remains of some kind, prehistoric and Roman being the most frequent. Cropmarks are of some help, though they do not always appear regularly or with the same intensity on the sites in the area. Some areas have no recorded cropmarks, though experience has also shown that there still may be plenty of archaeology.

7. CONCLUSIONS

7.1 Introduction

The road route may in its act of destroying archaeology be the main cause of revealing it and provide a transect across a landscape encompasing dryland sites on the terraces, marshside sites and wetland use of the marshes. There may be some pattern of settlement and landuse that relates to the changing sea-level and waterlogging in this part of the Thames valley as discussed by Evans (1992), Wilkinson (1989) and Needham (1989).

7.2 Areas of Archaeological Interest along the A 13 Improvement Route: Dagenham Heathway to Wennington

There are several main areas of interest:

1. Where the gravel terrace rises under the alluvium at the interface between the two, as at the Goresbrook/Scrattons Terrace/Ford's area and approaching Wennington Interchange.

2. Where there are deposits of peat (and of alluvium) being removed - around the Main Viaduct and bridges and the East Railway Viaduct.

3. Where the route crosses Rainham and Wennington Creeks, both formerly navigable and both with the possibility of riverside activities and the remains of boats/ships.

4. The dryland gravel terrace areas at each end of this section of the route.

5. Anywhere where the gravel rises, being the possibility of former higher ground, either shorelines, old channels, eyots or islands, all being areas for human activity or settlement.

8. RECOMMENDATIONS

The DOE Planning Policy Guidance Note 16 states:

'Archaeological remains should be seen as a finite, and non-renewable resource, in many cases highly fragile and vulnerable to damage and destruction. Appropriate management is therefore essential to ensure that they survive in good condition. In particular, care must be taken to ensure that archaeological remains are not needlessly or thoughtlessly destroyed. They can contain irreplaceable information about our past and the potential for an increase in future knowledge. They are part of our sense of national identity and are valuable both for their own sake and for their role in education, leisure and tourism.' (PPG 16 para 6)

8.1 Introduction

The route of the A13 Improvement Dagenham Heathway to Wennington cuts through several important archaeological zones, in brief - the gravel terrace and the important alluvium and peat deposits overlying it in the present day marshlands. These areas are likely to contain archaeological sites of all periods, and especially of the prehistoric and Roman periods. The alluvium and peats are of great significance to archaeoenvironmental studies. Given the alluvial nature of a good part of this section of the route, archaeological sites would be invisible or undetectable by normal archaeological survey methods. Therefore any such sites will be in effect 'unexpected' though predictable.

This area will provide opportunities for the study of changing settlement and landuse from the beginning of the post-glacial period until the present day, with particular interest in the prehistoric and Roman periods and for water-based and wetland activities of all periods.

8.2 Management of Sites

Where possible any archaeological sites should be preserved in situ and protected from damage during road building and its associated activities. There should be opportunities during the process for discussion regarding the preservation of sites.

Attempts should be made to maintain the current waterlogged conditions in the marshlands so as to preserve any waterlogged sites. This would also benefit any of the areas of Special Scientific Interest.

8.3 Archaeological Action

Before preservation *in situ* and protection of sites can be discussed, there needs to be various levels of archaeological work carried out. Once the final methods of road construction and ancillary works have been decided, more detailed archaeological proposals can be made.

8.3.1 Environmental Archaeology

Proposals and costings have already been submitted and agreed for environmental work along this part of the route. These are discussed in appendix 2, section 11.

Further environmental work should be included with any archaeological proposals.

8.3.2 Field Evaluations

There should be field evaluations where the road route and related activities appear to cut into the gravel terrace and its border with the alluvium at:

1. Scrattons Terrace - chainage 0-800m

2. The Link Road between the old and new A13s

3. The area leading up to the Wennington Interchange

The field evaluations it is hoped would provide sufficient information to decide the next appropriate archaeological action.

8.3.3 Watching Briefs

Much of the route covers deep, waterlogged deposits, some of which are going to be piled, others partially removed and some covered by embankments with large drains cut alongside. The archaeologists carrying out the watching briefs should be able to monitor and sometimes guide the removal of deposits and be able to stop their removal once archaeological remains and strata are reached.

Where the alluvium and or peats are to be removed there should be a watching brief which can, when and where necessary, become a full-scale excavation. Such areas are, for example the removal of the peat at chainage 800-1200m, the vertical band drains and peat removal at 2900-3500m, possibly the Link Road, the silt beds where clearing is to go down to the alluvium at 3500-4220m and similarly the Silt Lagoons at 5500-7000m and by the East

Railway Viaduct at 7000-7200m.

The drains associated with the route may also cut through archaeological deposits and should be subject to a watching brief.

Bridge abutments and the like should also be watched. In the case of Rainham and Wennington Creeks there is the possibility of archaeological remains associated with the wharves and there may be sunken vessels in the river beds. Such vessels might also be found in the Beam river, for example.

There should be an archaeological watching brief for all parts of the route where there is going to be or may be excavation below the present surface.

8.3.4 Archaeological Excavation

Archaeological excavation in the waterlogged deposits is likely to be expensive, particularly if well preserved, important sites are located. Where possible means should be found to preserve these in situ.

Judging by the data collected for the desk-top study and by the surveys, there are no precisely identifiable archaeological sites on the route. The route however covers a zone of enormous archaeological potential and an apparent lack of sites may be entirely deceiving. Although there are no sites that can be identified at this stage as needing preservation by record, that is by archaeological excavation followed by the production of a full and usable archive, it must not be assumed they do not exist.

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10. APPENDIX 1: GAZETTEER OF ARCHAEOLOGICAL SITES (Fig.1)

	SITE	GLSMR No.
1.	Goresbrook Leisure Centre, cropmarks of a marsh lane and an early ? Neolithic core rejuvenation flake and a Late Neolithic oblique arrowhead. Refs: Passmore Edwards Museum Collections.	
2.	Dagenham Idol: a wooden figure, dated by by radiocarbon to the late Neolithic from waterlogged alluvial deposits;a deer'skeleton found nearby. Refs: Coles (1990); Wright (1923).	060178
3.	Ford's Motorworks: industrial archaeological site.	
4.	Dagenham Breach: various sites in the lake caused by the Thames floods in 1707. Sites on it include a dam (formed by three ships (Government ships) used as landfill), Breach House (later replaced by cottages and an icehouse. Refs: Passmore Edwards Museum Records	
5.	Reputed plague burials Refs: Frank Lewis Notebooks 3.	060019
6.	Essex Waterworks powerhouse, South Hornchurch: Roman pottery. Refs: Passmore Edwards Museum records.	
7.	Mardyke Estate: Roman settlement Refs: Lewis (1966) 3; Passmore Edwards Museum Collections.	
8.	Manser Road, South Hornchurch: early and late Roman burials Refs: Farmer (1930); Lewis (1966) 3.	
9.	Post-medieval house	061477
10.	Rainham wharf and granary Refs: Victoria County History Essex (VCH), vol. VII ((1978) 136.	060394
11.	Rainham village - Saxon, medieval and later Refs: VCH, vol. VII (1978) 126ff and passim.	
12.	Bridge Road, Rainham: prehistoric, Bronze Age and Roman site. Refs: Passmore Edwards Museum excavations 1989; Meddens and Beasley (1990).	
13.	Three Crowns Inn, Ferry Lane, Rainham: Finds of Roman pottery Refs: Lewis (1966) 4.	060395

14. Rainham-Ferry Lane: prehistoric peat deposits.
Refs: Passmore Edwards Museum watching brief 1989.

15. Brookway, Rainham: early Neolithic settlement, Roman activity and medieval settlement.
Refs: Passmore Edwards Museum excavations 1992.

16. South Hall Farm, Rainham: 060107
cropmarks of enclosure-like features.
Refs: RCHM Airphotographs: TQ 5381/2, 5382/3.

17. South Hall Bridge, Rainham: 060387
post-medieval bridge.

18. South Hall farmhouse, Rainham: 211430
medieval manor and medieval and post-medieval farmhouse
Refs: VCH VII (1978) 133-134.

19. East Hall Farm, Wennington: 060106
cropmarks of a ring-ditch with a central pit and linear features
Refs: RCHM Airphotographs: TQ 5381/1 and TQ 5381/4/395.

20. East Hall Farm, Wennington: 060357
linear cropmarks
Refs: RCHM Airphotographs: TQ 5381/4/393.

21 East Hall Farmhouse, Wennington: 061068
medieval and post-medieval farmhouse
Refs: VCH VII (1978) 186.

22. Great Arnold's Field, Launders Lane, Rainham: 060006
Neolithic ring-ditch with a central pit; Mesolithic, Neolithic and Beaker period finds. To the north-west an early Medieval farmstead.
Refs: Excavations by D.D.A.Simpson and I.Smith in 1963; finds in the Passmore Edwards Museum;
RCHM Airphotographs: TQ 5481/1 and TQ 5481/2.

23. Spring Farm, Rainham: 060073
cropmarks of archaeological and ? geological features, including a rectilinear enclosure and ditches.
Refs: RCHM Airphotographs: TQ 5482/1/397, 401, 403, 405,TQ 5482/2/58; TQ 5482/6/401,406.

24. Rainham Jewish Federation Cemetery: 060069-71
Middle Bronze Age, Late Iron Age, Roman and medieval finds from grave-digging
Refs: Passmore Edwards Museum Collections
Also cropmark in NE corner
Refs: RCHM Airphotographs: TQ 5482/5/399.

25. Moor Hall Farm, Launders Lane, Rainham: 060058-62
possible Late Bronze Age low-barrow cemetery, Middle Iron Age farmstead, Late Iron Age hillfort and Roman settlement, discovered from airphotgraphs.
Refs: Passmore Edwards Museum excavations; Greenwood (1982); RCHM Airphotographs: many under TQ 5481 and TQ 5482.

26. Moor Hall Farm, Rainham: faint cropmarks.
Refs: RCHM Airphotographs: TQ 5481/4/159.

27. Launders Lane, Rainham: continuation of cropmarks leading from the Middle Iron Age and Roman zones of site 25.
Refs: RCHM Airphotographs: TQ 5482/1.

28. Gerpins Pit, Gerpins Lane/Warwick Lane, Rainham:
060605,060646-51
Palaeolithic hand-axes, Neoithic polished axe, Beaker pot, Early Bronze Age food vessel, Roman flagons and pottery and a pagan Saxon cemetery all recovered in 1937. No settlement site located.
Refs: Evison (1955); a majority of finds in Passmore Edwards Museum (few), Valence House Museum and the British Museum.

29. Wennington, Leventhorpes: 061063
medieval to post-medieval house.
Refs: VCH VII (1978) 184.

30. Wennington wharf: post-medieval wharf on Wennington creek, navigable until c. 1650. Possibly navigable in earlier periods when sea-levels favourable.
Refs: VCH VII (1978) 185.

31. Wennington Hall: 060468
medieval manor and later house
Refs: VCH VII (1978) 182-183.

32. South-east of Wennington: faint cropmarks, possibly of a drainage system.
Refs: Passmore Edwards Museum records.

33. Cropmarks beside the county boundary east of Wennington:
Refs: NMR/MAL:76055 30/06/76 British Gas.

34. Noak (Noke) House, Wennington: 060467
medieval manor and later house, converted in c.1808 into a joint workhouse shared between Aveley, Wennington and West Thurrock.
Refs: VCH VII (1978) 184-185.

35. Aveley, near Willow Cottages, Wennington: Mesolithic flints, probably stray finds.
Refs: ECC data; Wymer (1977) 189.

36. Wennington Village: medieval and post-medieval village of Saxon origins.
Refs: VCH VII (1978) 181 ff

GREATER LONDON ENVIRONMENTAL ARCHAEOLOGY SERVICE

A13 IMPROVEMENTS

Archaeological evaluation

The proposed route of the A13 improvements lies across low lying land just north of the River Thames between Barking and Aveley. Borehole evidence and other work in the area has shown that the underlying deposits in this area are composed of prehistoric peats and Thames alluvium overlying Pleistocene floodplain gravels and London Clay.

Previous work downstream and at Tilbury has identified a long sequence of Thames deposits that have formed as a result of rising sea levels over the last 10,000 years. During this period five major regression phases have been identified when sea level dropped, alluviation ceased, and peat deposits formed. Recent work near Rainham Creek revealed two peat horizons and a possible third suggesting that the sedimentary sequence in this area extends as far back as 5000 years and possibly 7000 years. The borehole data for the A13 improvement scheme suggests that at locations along the route two peat horizons and sometimes three can be recognised the uppermost of which lying between -4 to -1m OD probably relates to the Tilbury IV transgression which is dated elsewhere to between 850 and 1500 BC.

This sequence of sediments has three important implications for archaeology.

1. The sediments contain a sequence of biological and sedimentary evidence that through analysis can elucidate changes in the landscape and vegetation brought about by both natural and human causes.
2. The transgressions exposed large areas of floodplain to human occupation and activity. Therefore the peat horizons may contain evidence of human activity.
3. As the river rose and laid down alluvium on the floodplain, prehistoric activity along the edges of the river will have been inundated and buried. Therefore where the underlying gravels rise up towards the terrace edge a sequence of prehistoric shorelines may have been buried by alluvium.

Environmental archaeology is concerned on two accounts. It is important to establish, through the analysis of dated natural sediments, vegetational and landscape changes through time in the London region and more locally. Under 1 above the line of the A13 has considerable possibilities for supplying important deposits that demand such study.
Secondly should prehistoric occupation be identified either in the peats or along the terrace edge then its burial under alluvium will have preserved the prehistoric landsurface and any debris from the occupation largely intact.

The following requirements are concerned with the first element above. The second will be included with other archaeological demands for the project.

Proposals for Environmental work on the A13 Improvements scheme.

The options noted for works along the line of the A13 Improvements indicate that in most areas subsurface disturbance will be limited to piling. Experience has shown that while monitoring of piling works and augering is important for recording the occurrence of peat deposits and selective samples of deposits and wood for radiocarbon dating, detailed analysis of material collected during such exercises has limited potential. Work along these parts of the route can be covered by the archaeological watching brief and 'call outs' when deposits of interest are located.

At two locations on the route ground reduction and excavation are recommended as the options. Between chainage 800 and 1200 it is proposed to excavate the alluvium to -2 or -3 m OD. This is an area where the underlying gravels are rising and includes a peat deposit that may be of Iron Age or much more recent date. Archaeological remains may well survive in this area. Environmentalists would need access to a cleaned section of the deposits for a day, sampling requirements are likely to be as follows:

> The whole sedimentary sequence needs to be sampled to cover all areas of paleoenvironmental potential - particularly sediments, soil micromorphology, pollen, diatoms, plant macrofossils, insects, molluscs, wood and samples for C14 and Optical dating. It is essential that the sampled sections are fully drawn and all sediment boundaries levelled in.
>
> This normally requires a sequence of boxed channel samples for sediments, soil micromorphology, pollen and diatoms, with an adjacent (tied in) bulk column at sample intervals of 5 or 10 cm for macrofossil analysis. Timber and wood samples should be collected independently, as should C14 samples. Large timber pieces removed during excavation should be saved with locational data and checked for tree species to establish their suitability for dendrochronological analysis (please notify GLEAS if such timbers are discovered). In the absence of peat deposits, or due to extensive alluvial deposits Optical dating should be considered. This will require a boxed column sample, immediately wrapped in black plastic to exclude light. It is recommended that some of these samples (eg sediments, soil micromorphology) are taken by the specialist to be commissioned to do the analyses. Other samples can be taken by site staff, but a visit from the GLEAS should be arranged prior to sampling, which could be undertaken by the GLEAS.

This collection and recording is standard on all excavated sites revealing alluvium and peat deposits.

At a second area to the west of the East Railway viaduct, chainage 7000 - 7200, excavation of the alluvial clays and peats is proposed. This excavation will remove alluvium and peats to a depth of over 10 metres, including an upper peat

horizon at approximately -2 m OD and possible lower peat deposits indicated by boreholes east and west although not present in BH117. These deposits are likely to span 6-7000 years, although erosion episodes may have caused hiatus' in the sequence. With such an extended depositional history a comprehensive sampling exercise is necessary, and site work should ensure that a full sequence of the deposits is collected. This may require a special window in any shoring for the sampling to be carried out or it may necessitate repeated presence on site during the ground reduction works, in order to sample small section units while the excavations are in progress. Sampling will be required as indicated above.

12. ACKNOWLEDGEMENTS

The authors wish to thank all those who helped with the project, particularly the field survey staff and volunteers and the landowners and tenants. The Department of Transport kindly supplied the names and addresses of landowners and tenants, route maps and construction details of the route.

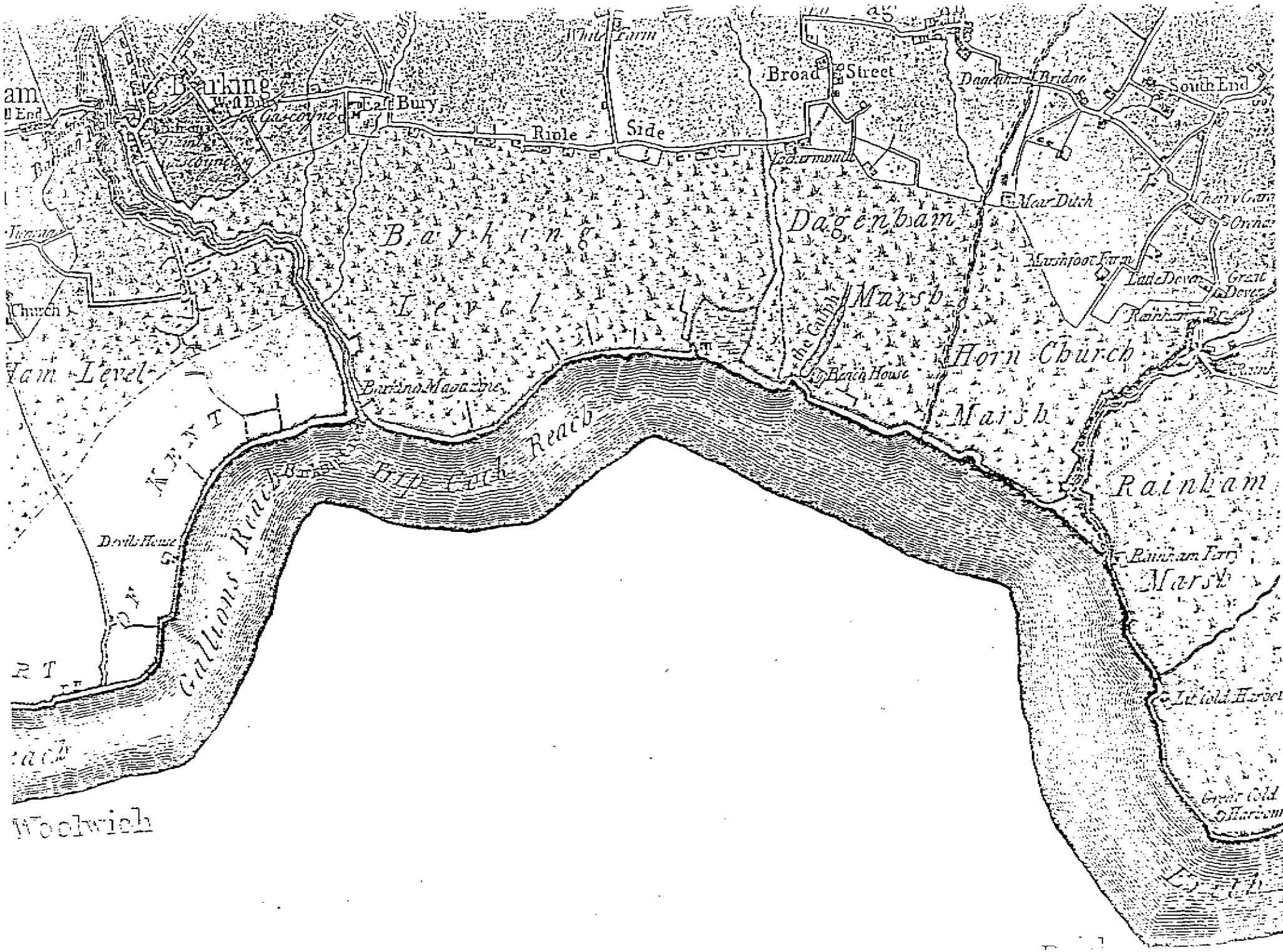


Figure 2: Chapman and Andre's Map of Essex - extract.

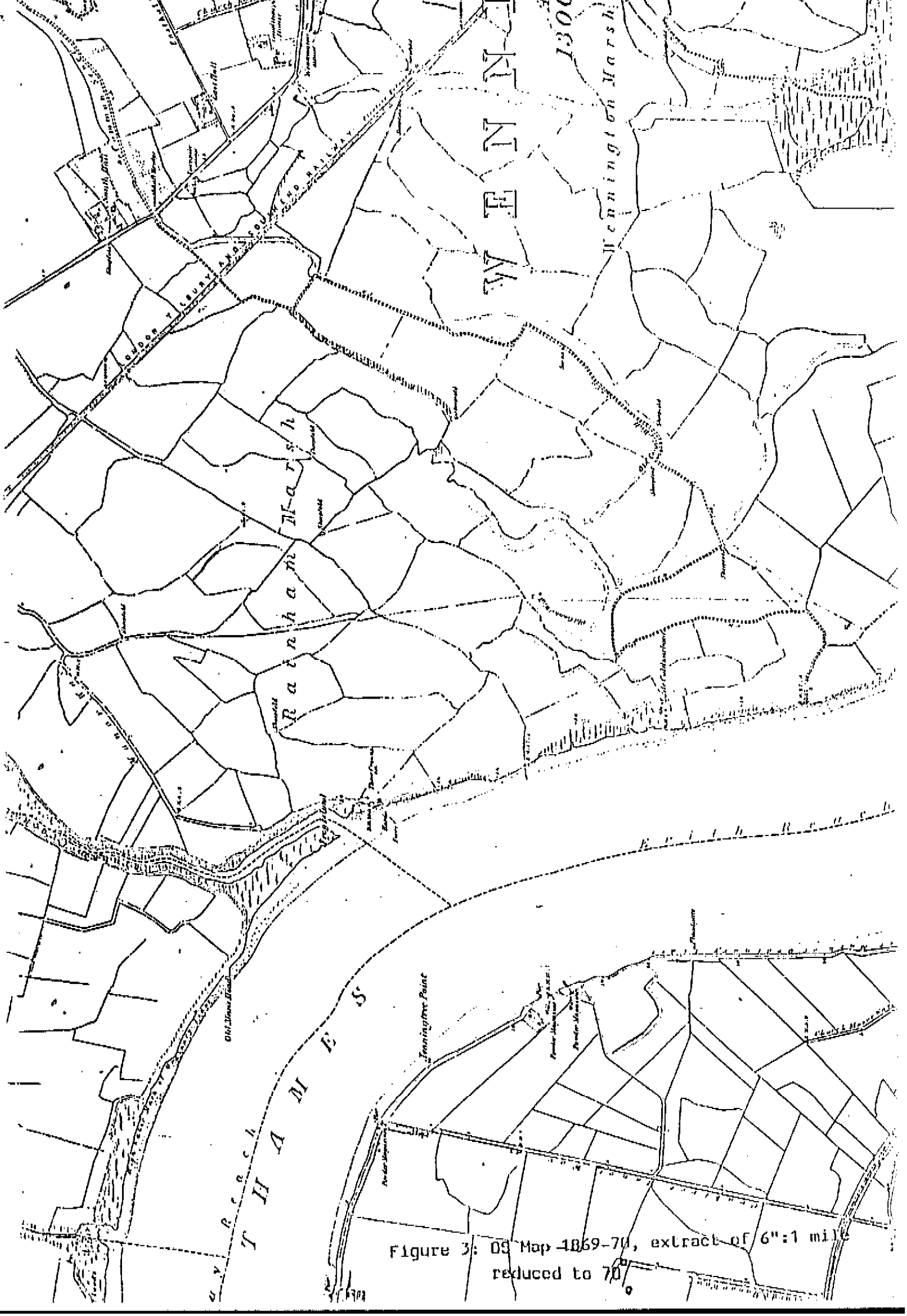
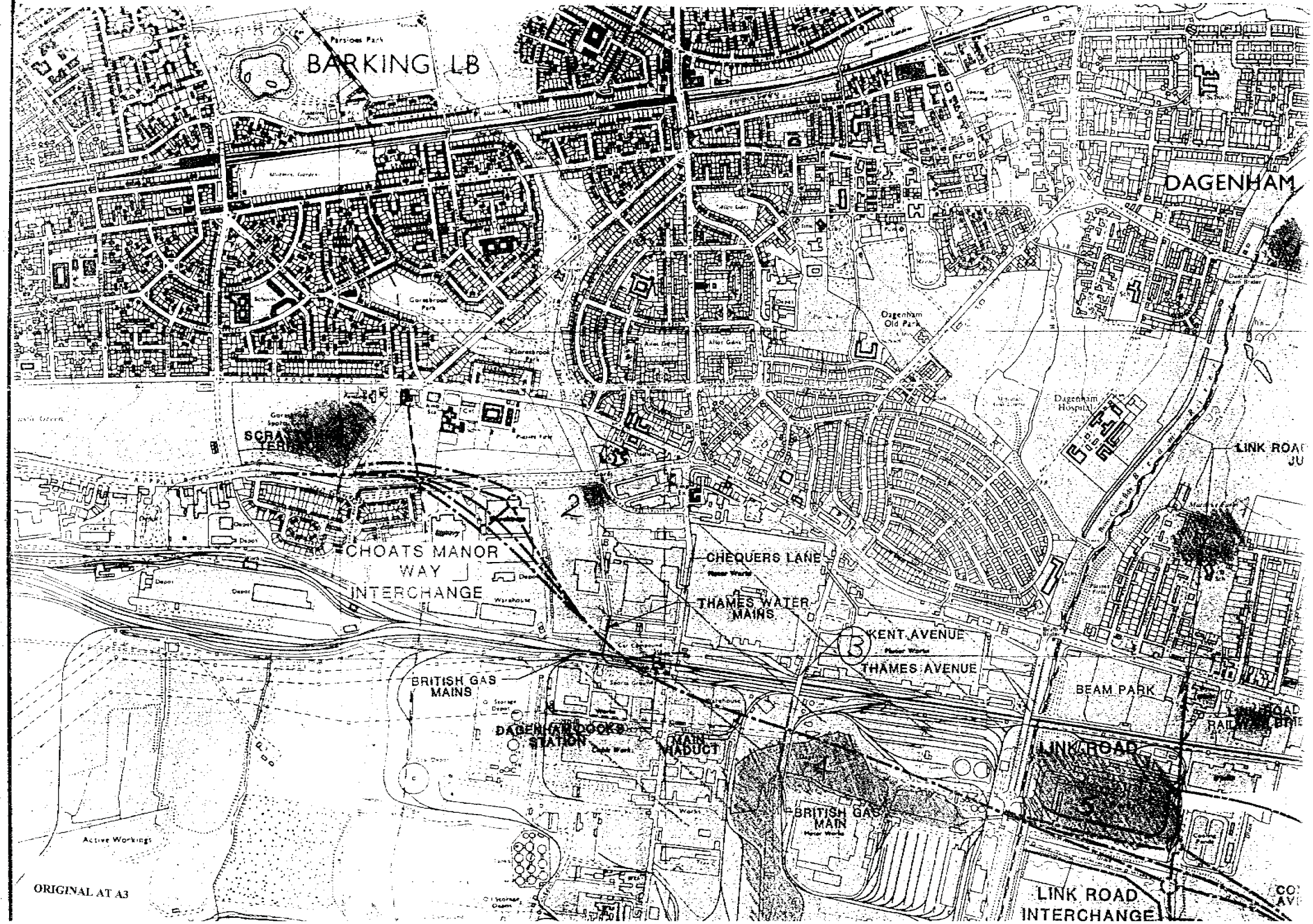
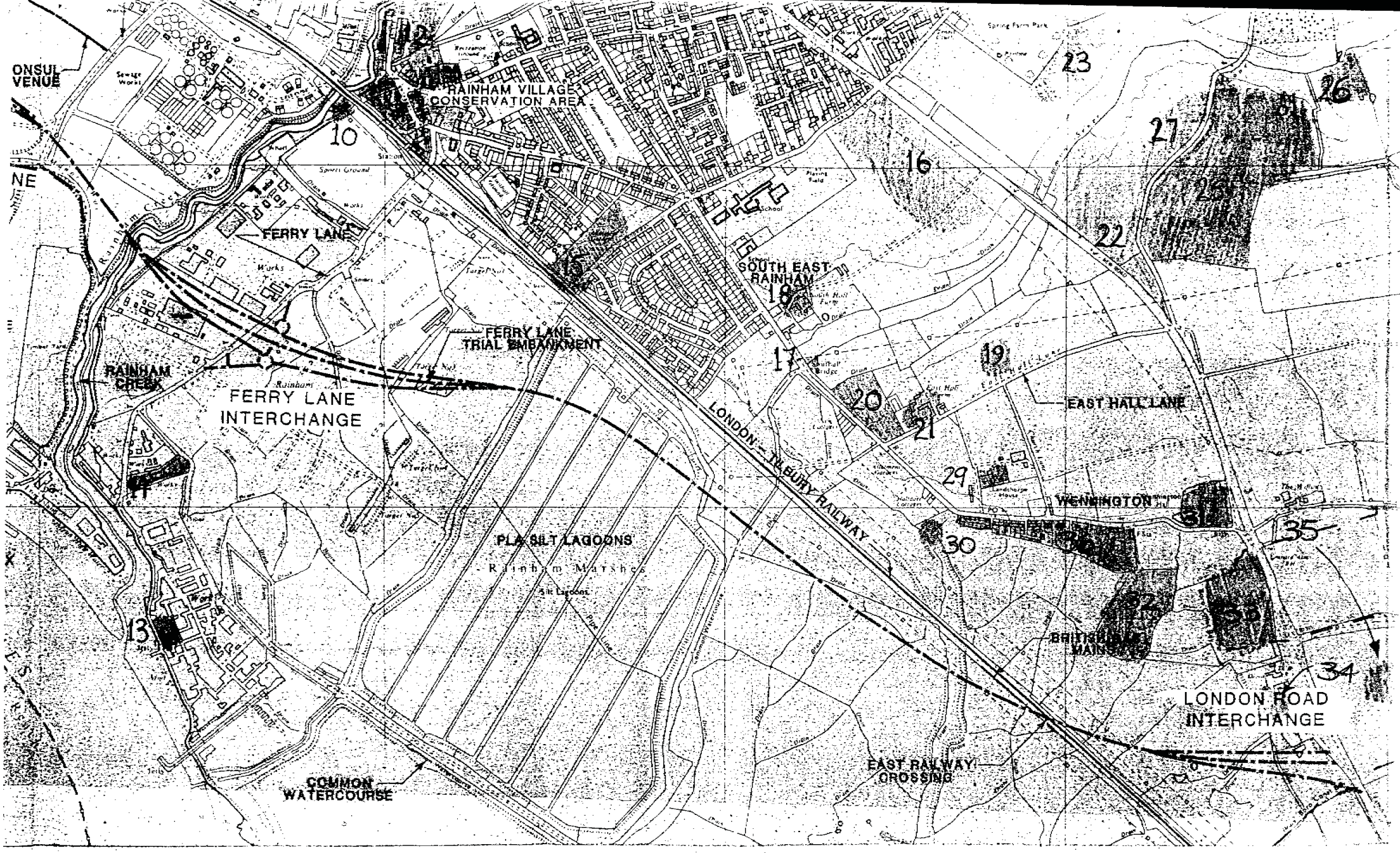


Figure 3: OS Map 1869-70, extract of 6":1 mile reduced to 70%

Figure 4: The Dagenham Idol; size 490mm, and recently dated to the late Neolithic


BARKING LB
DAGENHAM
CHOATS MANOR WAY INTERCHANGE
CHEQUERS LANE
THAMES WATER MAINS
KENT AVENUE
THAMES AVENUE
BRITISH GAS MAINS
BEAM PARK
LINK ROAD
BRITISH GAS MAIN
LINK ROAD INTERCHANGE
Active Workings
ORIGINAL AT A3



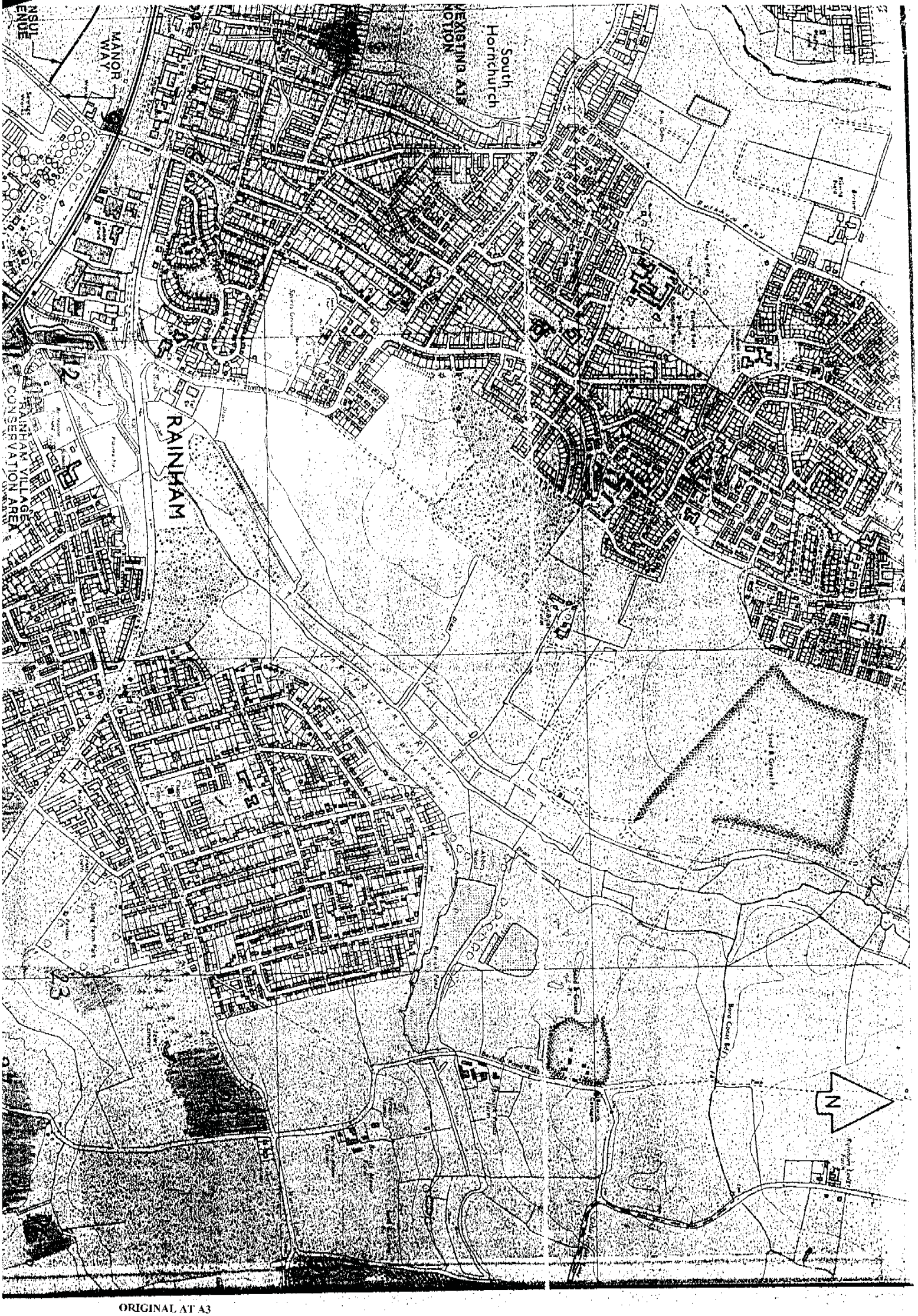
ORIGINAL AT A3

CLIENT

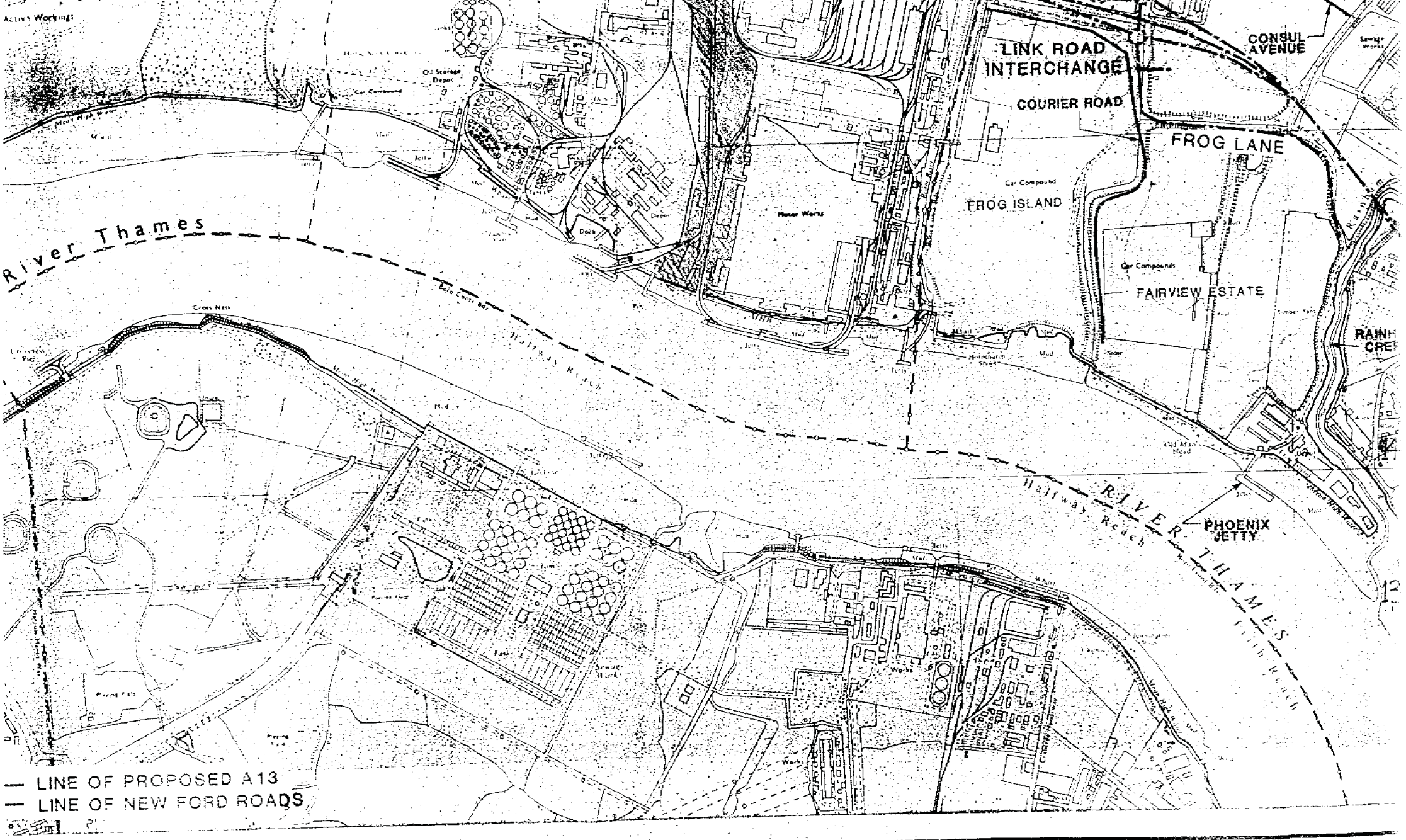
THE DEPARTMENT OF TRANSPORT

TITLE

Fig 1: SITES & AREAS OF ARCHAEOLOGICAL INTEREST
LOCATION PLAN



ORIGINAL AT A3



REVISION			
No	Date	Description	Checked
A	15/09/92	FURTHER INFORMATION ADDED	

DRAWN | ENGINEER

NOTES

Archaeological Area or Archaeological Site

Ford's Industrial Archaeological Area

ORIGINAL AT A3