

**An Archaeological Evaluation at  
Knockhall School, Greenhithe, Kent**

**NGR 559220 174660**

**Project No. 3459  
Site Code: KSG08**

**ASE Report No. 2008096  
OASIS ID: archaeol6-44779**

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With a major contribution by  
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**June 2008**

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## **Abstract**

Archaeology South East was commissioned to undertake an evaluation of ground to the rear of Knockhall Primary School, off Abbey Road, Greenhithe, Kent. The site is centred on NGR 559220 174660. The work took place prior to the building of temporary structures to provide a children's centre. A single 30m x 1.8m evaluation trench was excavated. Two 1.8m by 4m test pits were also excavated at each end of the trench, supervised by a Palaeolithic/Pleistocene specialist (Francis Wenban-Smith). A small assemblage of worked flint flakes dating from Mesolithic to Bronze Age was recovered. No further artefacts or features were observed.

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## **1.0 INTRODUCTION**

### **1.1 Site Background**

- 1.1.1 Archaeology South East was commissioned to undertake an evaluation of ground to the rear of Knockhall Primary School, off Abbey Road, Greenhithe, Kent. The site is centred on NGR 559220 174660. The work was to take place prior to the building of temporary structures to provide a children's centre.

### **1.2 Geology and Topography**

- 1.2.1 British Geographical Survey Map (Sheet 271) for the area shows the natural to be Boyn Hill Gravel. The site was located on an open grassed area of generally level ground although on a slight plateau.

### **1.3 Planning Background**

- 1.3.1 The Property Group at Kent County council (KCC) and their agents EC Harris Ltd, were advised by the Heritage Conservation Group, also of KCC, that a planning condition, specifying the completion of a programme of archaeological work, would be applied to the application. The condition stated that:

*No development shall take place until the applicant, or their agents or successors in title, has secured the implementation of a programme of archaeological work in accordance with a written specification and timetable which has been submitted to and approved by the Local Planning Authority.*

*Reason: To ensure that features of archaeological interest are properly examined and recorded.*

- 1.3.2 The Heritage Conservation Group recommended that an archaeological evaluation by trial trench and geoarchaeological investigation by test pitting would form an appropriate mitigation response. A Written Scheme of Investigation for this work was produced by the Heritage Conservation Group.
- 1.3.3 The archaeological potential of the site, particularly with a view to the recovery of early prehistoric material, was such that specialist work, (including the geoarchaeological test pitting), was undertaken to recover and investigate gravel deposits present on site. This specialist work was undertaken by Francis Wenban – Smith and is the subject of a report included as Appendices 1 and 2.

### **1.4 Scope of Report**

- 1.4.1 This report details the results of the archaeological evaluation. The report on the geoarchaeological investigation is included as Appendices 1 and 2
- 1.4.2 The work was undertaken between 27<sup>th</sup> and 29<sup>th</sup> of May 2008, by Deon Whittaker (Archaeologist) and Chris Russell (Site Assistant). Francis Wenban-Smith was in attendance on the 28<sup>th</sup> and 29<sup>th</sup> May 2008.

## **2.0 ARCHAEOLOGICAL BACKGROUND**

**2.1** The area's gravels have potential for the recovery of Palaeolithic material. Previous archaeological works carried out at Knockhall Primary School and within local vicinity have also revealed evidence for a broad range of periods. The HER records list a number of entries within a 500m radius of the site which are summarised as follows:

**2.2** Palaeolithic - 500000 BC to 10001 BC

SMR Entry TQ 57 SE 176 - Mke20269. The high ground at the southern side of the development area at Ingress Abbey contains the northern edge of the Boyn Hill / Orsett Heath Pleistocene formation, known to be rich in Palaeolithic artefactual and faunal evidence. Palaeolithic flint flakes were found in gravels interpreted as fluvial gravels of the pleistocene period. The presence of artefact bearing pleistocene sediments led to further mitigating fieldwork. The flint assemblages represent evidence of early human activity in the Lower Thames region with implications for the study of climate change at the time of the formation of the deposits.

A Chellean shell bed found near the Ingress Tavern, Greenhithe at TQ 59507477 contained some five hundred flakes, considered by some to be Acheulian. Further Acheulian and Mousterian artefacts, were recovered from Globe Pit, Greenhithe between 1900-1920 (TQ 57 SE 16 - MKE792). Other finds include a single Palaeolithic flake, slightly rolled and heavily patinated, with a plain butt and three dorsal flake scars (TQ 57 SE 170 - Mke20254) and a Lower Palaeo handaxe (TQ 57 NE 107 - MWX20807) from Enbleton's Garden at Ingress Abbey located at TQ 591 750, thirty seven Lower Palaeo. handaxes, 1 core and 6 pieces of debitage (TQ 57 SE 216 - MWX20808) from Ingree Vale TQ 595 745.

**2.3** Early Neolithic to Late Bronze Age - 4000 BC to 701 BC

TQ 57 SE 177 - Mke20270. A small number of residual Neolithic or Bronze Age struck flint flakes were recovered during fieldwork south west of the house. Two of the flakes resembled poorly fashioned blades.

**2.4** Early Bronze Age 2350 BC to 1501 BC

SMR Entry TQ 57 SE 242 - Mke20075. Evidence of a middle Palaeolithic occupation level (TQ 57 SE 51) was found in 1931 by Burchell, in Collyers Pit, Swanscombe, at TQ 59737452 as above. Also found were small sherds of early Bronze Age. coarse, gritty pottery.

**2.5** Iron Age - 800 BC to 42 AD

SMR Entry TQ 57 SE 20 - MKE796. Denehole, consisting of a shaft leading to a pear-shaped opening, found in 1879. Possibly Iron Age, three skeletons were found on the floor of the cave. Both the shaft and cavity were completely filled with a mass of sand and gravel, and a quantity of animal bones, including horse, ox, pig, dog and deer. The denehole was later used as a Roman refuse pit with fragments of coarse Roman pottery, pieces of samian ware, objects of iron, two carved bone sockets and two worked stones.

**2.6** Roman 43AD – 409AD

SMR Entry TQ 57 SE 11 - MKE787. A vase and a Roman urn containing ashes, were found about 600 feet from Ingress Abbey, with TQ 57 SE 56 - MKE832, a Roman cremation urn and an earthenware bottle with other burial relics, found at Greenhithe, about fifty yards north of a suspected Roman road (TQ 589074830).

TQ 57 SE 175 - Mke20268. Three Roman linears were identified during fieldwork in the south west of the Ingress Abbey Development Area. They were interpreted as being part of an early Roman military encampment, of probable Neronian/early Flavian date.

**2.7** Post Medieval – Modern

SMR Entry TQ 57 NE 94 & 93 - Mke20054. A chalk extraction quarry had been in use to the east of Ingress Abbey during the late 19th century and c.1930s when the Ingress Abbey Paper Mill was built to the north-east (TQ 57 NE 97). The Abbey, built in 1832-3 to a Tudor-Gothic style, was reused as the Thames Nautical Training College and latterly a Merchant Navy College. Believed to be the fifth house on the site, the manor having formerly belonged to Dartford Priory. A number of listed structures, some incorporating known mediaeval material are present within the Ingress Abbey grounds.

A number of C19th properties (1 -56 Knockhall Road) remain in the vicinity of the site, with C19th St Mary's Church in the High Street at TQ 5948 7489.

**2.8** Modern

SMR Entry TQ 57 SE 123 - MKE9218. Air raid warden post of rectangular concrete construction with a flat roof on which rests a metal sub-frame for a siren mounting. Possibly of WW2 date with post-war use. Craylands Gorge (TQ 5936 7418), Swanscombe Heritage Centre and Western Cross Quarry are joined by remains from the quarry process. These include tramways, tunnels and other associated structures and services.

### **3.0 ARCHAEOLOGICAL METHODOLOGY**

#### **3.1 Methodology**

- 3.1.1 The methodology comprised the machine excavation, under constant archaeological supervision, of a single 30m by 1.8m evaluation trench, using JCB equipped with a 1.8 metre wide ditching bucket. Excavation was undertaken in spits of no more than 0.10m to the top of the underlying natural substrate, or to the top of archaeological deposits, whichever was higher.
- 3.1.2 There was requirement for the excavation of two, 1.8m wide by 4m long test pits within each end of the trench, under the direction of the palaeo-specialist. These pits were excavated by machine to depth as required by the palaeo-specialist (see Appendix 1).
- 3.1.3 All deposits were recorded using ASE standard context sheets, with colours recorded using visual inspection. The trench was recorded on plastic drawing film at appropriate scales.
- 3.1.4 A full photographic record (digital, colour slide and black and white) was made.
- 3.1.5 Gravel samples were extracted from the two test pits. In the first instance, six gravel samples were extracted. Two of these were first subject to a 20 litre sample apiece for lithographic analysis and other specialist analysis. All six were then sieved through a 10mm sieving tray with a view to recovering any Palaeolithic artefacts (see Appendix 1).
- 3.1.6 The trench was scanned using a CAT scanner to identify any buried services prior to the commencement of excavation.
- 3.1.7 Spoil heaps and trench bases were scanned using a metal detector and by eye, for unstratified artefacts.
- 3.1.8 The test pits and trench were then backfilled and compacted..

#### **3.2 Aims and Objectives**

- 3.2.1 Specific Aims of the fieldwork, as outlined in the WSI were:
- To assess the likely impact of the proposed development on any archaeological remains
  - To assess the impact of previous development upon the site's archaeological remains
  - To assess the potential of the site to contain archaeological remains of national importance
  - To assess the potential for the gravels to contain early prehistoric material
  - To establish the degree of medieval and post- medieval activity on the site
  - To establish the degree of Prehistoric and Roman activity on site
  - To contribute to the understanding of the environmental and landscape history of the area

### 3.3 Quantification of Archive

**Table 1. Site Archive Quantification**

Number of Contexts	4
No. of files/paper record	1 files
Plan and sections sheets	0
Bulk Samples	2(for external palaeo-specialist work)
Photographs	1 colour slide film, black and white and digital
Bulk finds	0
Registered finds	0
Environmental flots/residue	0



## 4.0 RESULTS

### 4.1 Trench 1 (Fig. 2)

Trench 1 was 30 metres long by 1.8 metres wide, running north east to south west.

#### 4.1.1 Table 2. List of Recorded Contexts

Number	Type	Description	Max. Length	Max. Width	Max. Depth	Height AOD.m
1/001	Deposit	Topsoil	30m	1.8m	0-0.17m	31.97m
1/002	Deposit	Subsoil	30m	1.8m	0.17-0.35m	31.8m
1/003	Deposit	Redeposited Gravels	30m	1.8m	0.35-0.79m	31.62m
1/004	Deposit	Natural	30m	1.8m	-	31.14m

#### 4.1.2 Summary

Natural geology, [1/004], comprising friable, light orange brown sandy clay with rare rounded flint pebbles (from 50 - 250mm in size) was encountered at a maximum height of 30.95m OD at the south-west end of the trench, sloping gradually to 31.14m OD to the north-west. Several sub-circular bands of gravel were present within [1/004] and were established by the palaeo-specialist to be natural involutions. Overlying context [1/004] was a deposit of loose light orange brown gravelly, sandy clay, [1/003], with very frequent poorly sorted flint pebbles and pebble fragments. This context had a fairly clean interface with the underlying natural. Finds were recovered from the gravel [1/003], consisting of worked and burnt flint flakes. Above [1/003] was a loose to friable deposit of mid greyish brown sandy clay (subsoil) containing two fragments of blue and white transferware (not retained). This context included occasional rounded flint pebbles (50 – 150mm) in size. The overlying topsoil was loose, mid greyish brown sandy clay with rare flint fragments (less than 10mm in size).

There were no archaeological features within Trench 1.

## 5.0 THE FINDS

5.1 A small assemblage of flintwork was recovered from the evaluation. A summary can be found in Table 3.

Context	Flint (no.)	Flint (weight g.)
unstratified	2	60
[1/003]	4	476

Table 3. Finds Quantification

### 5.2 Prehistoric flintwork by Chris Butler

5.2.1 A small assemblage of six pieces of worked flint weighing 536g was recovered during the work, and is summarised in Table 4. A single piece of unworked fire-fractured flint (56g) was also recovered from context [1/003].

5.2.2 The assessment comprised a visual inspection of each bag, counting the number of pieces of each type of worked flint present, noting details of the range and variety of pieces, general condition, and the potential for further detailed analysis. A hand written archive of the assemblage was produced at this stage, together with an excel database. Those pieces of flint that were obviously not worked were discarded during the assessment.

5.2.3 The raw material is mostly shades of grey, with some pieces of black flint. Where cortex is present on a couple of pieces, it is a white to light buff colour.

Table 4 The Flintwork

Type	Number
Soft hammer-struck flakes	1
Cores	2
Scrapers	2
Notched flake	1
<b>Total</b>	<b>6</b>

5.2.4 This small assemblage comprises a mixture of debitage and implements. A single, probably soft hammer-struck flake with platform preparation was recovered from context [1/003]. The two cores comprise a multiple-platform flake core with platform preparation, which was unstratified, and an unprepared multiple-platform flake and blade core from context [1/003]. The former is probably Mesolithic, whilst the latter, and the flake, are probably earlier Neolithic.

5.2.5 The two scrapers comprise a side scraper manufactured on a hard hammer-struck flake, and a large end scraper, which has been utilised rather than retouched at its distal end. Both of these came from context [1/003], and are likely to be later prehistoric. The small notched hard hammer-struck flake (unstratified) is also likely to be later prehistoric (Later Neolithic to Bronze Age) in date.

5.2.6 This small assemblage has little potential for further study. It is recommended that no further work be undertaken on this assemblage, although the flintwork should be retained for possible further study in the future.

## **6.0 DISCUSSION**

### **6.1 Stratigraphic Summary**

The single evaluation trench revealed a simple stratigraphic sequence of topsoil [1/001] and subsoil [1/002] overlying a gravel deposit, [1/003] over the natural sands and clays, [1/004]. The natural substrate, [1/004], appeared at around 30.95m OD to 31.14m OD, underneath approximately 0.70m of overburden (contexts [1/001]-[1/003]). The site appears to be fairly level throughout the land set aside for development and there is no cause to suspect any radical change in the sequence encountered throughout this area.

### **6.2 Archaeological Remains**

No archaeological features were identified, although the natural sand exhibited sub circular linear deposits of gravel, initially suspected to be of cultural origin. These were, however, formed by gravel infilling of cracks in the natural during natural geological processes (pers. comm Wenban-Smith).

**6.3** Several struck flints were recovered from context [1/003], of a possible Mesolithic, Neolithic and Bronze Age date and including debitage and implements. Although the assemblage is small and has little potential for further study, it does serve to demonstrate that there may have been prehistoric activity in the vicinity, although there is doubt over the integrity of this context (see below).

### **6.4 Geoarchaeological Investigation**

The geoarchaeological investigation did identify Pleistocene deposits but no Palaeolithic artefacts were recovered (Appendix 1).

### **6.5 Level of truncation and Made Ground**

It is possible that the slight plateau on which the site was located was the product of imported material. There is some circumstantial evidence for this as the gravelly layer, [1/003], directly overlying the natural sands and clays, [1/004] had a reasonably abrupt horizon with this underlying context. It is possible that this layer (and therefore the overlying topsoil and subsoil) was imported. The Geoarchaeological report, (Appendix 1) also makes the suggestion that the upper 0.70m of the sequence is potentially 'made ground', partly on the basis of the flintwork contained within (see Abstract, Appendix 1)

However it would perhaps be expected to recover more material of post-medieval – modern date from such a substantial piece of landscaping. Equally, the fairly gravelly sandy clay subsoil and topsoil would not be out of place in association with the natural geology as present within the trench.

**6.6** Even if these contexts were imported, which is questionable, there is no evidence that the surface of the natural substrate has been truncated. A cursory inspection of the Historic Ordnance Mapping on the Kent Landscape Information System (<http://extranet7.kent.gov.uk/kliis> accessed 01.07.08) shows that there has been no development on the site prior to the construction of the school in the 1930's-1950's which did not extend into the vicinity of Trench 1. It therefore suggested that the archaeological horizon remains broadly intact. It is impossible to speculate further on this without wider knowledge of the stratigraphic sequence in the immediate area outside of the development footprint.

**7.0 CONCLUSION**

- 7.1** The general aim of the evaluation, as outlined in the WSI has been fulfilled. It has been possible to indicate that there are no archaeological features present and there is no conclusive evidence that the archaeological horizon, (surface of the natural [1/004]), has been truncated by previous development. There is some suggestion of prehistoric activity in the vicinity, evidenced by the small assemblage of flintwork. Evidence for later periods was not forthcoming.
- 7.2** The aims as relating to the potential of the gravels to contain early prehistoric material are addressed in the appended specialist report (Appendix 1).
- 7.1** The methodology of combining test pits and evaluation trench in one excavation has provided an effective method for establishing the pleistocene sequence of deposits and the subsequent landscaping.

## **8.0 BIBLIOGRAPHY**

Heritage Conservation Group, KCC 2008 Specification for archaeological and geoarchaeological evaluation on land at Knockhall Primary School, Greenhithe, Kent

**SMR Summary Form**

Site Code	KPS08					
Identification Name and Address	Land to rear of Knockhall Primary School					
County, District &/or Borough	Greenhithe Kent					
OS Grid Refs.	TQ 592 747					
Geology	Boyne Gravels					
Arch. South-East Project Number						3459
Type of Fieldwork	Eval. ✓	Excav.	Watching Brief	Standing Structure	Survey	Other
Type of Site	Green Field	Shallow Urban	Deep Urban	Other		
Dates of Fieldwork	Eval.	Excav.	WB.	Other		
Sponsor/Client						
Project Manager	Diccon Hart					
Project Supervisor	Deon Whittaker					
Period Summary	Palaeo.	Meso.	Neo.	BA	IA	RB
	AS	MED	PM	Other Modern ✓		
<p>Archaeology South East were commissioned to undertake an evaluation of ground to the rear of Knockhall Primary School, off Abbey Road, Greenhithe, Kent. The site is centred on NGR 559220 174660. The work took place prior to the building of temporary structures to provide a children's centre. A single 30m x 1.8m evaluation trench was excavated. Two 1.8m by 4m test pits were also excavated at each end of the trench, supervised by a Palaeolithic/Pleistocene specialist (Francis Wenban-Smith). A small assemblage of worked flint flakes dating from Mesolithic to Bronze Age was recovered. No further artefacts or features were observed.</p>						

**OASIS SUMMARY FORM**

**OASIS ID: archaeol6-44779**

Project details

Project name Knock Primary School Greenhithe

Short description of the project Archaeology South East were commissioned to undertake an evaluation of ground to the rear of Knockhall Primary School, off Abbey Road, Greenhithe, Kent. The site is centred on NGR 559220 174660. The work took place prior to the building of temporary structures to provide a children's centre. A single 30m x 1.8m evaluation trench was excavated. Two 1.8m by 4m test pits were also excavated at each end of the trench, supervised by a Palaeolithic/Pleistocene specialist (Francis Wenban-Smith). A small assemblage of worked flint flakes dating from Mesolithic to Bronze Age was recovered. No further artefacts or features were observed..

Project dates Start: 27-05-2008 End: 29-05-2008

Previous/future work Yes / Not known

Type of project Field evaluation

Site status None

Current Land use Other 14 - Recreational usage

Monument type . None

Monument type . None

Significant Finds . None

Significant Finds . None

Methods & techniques 'Sample Trenches','Test Pits'

Development type Public building (e.g. school, church, hospital, medical centre, law courts etc.)

Prompt Project location Direction from Local Planning Authority - PPG16

Country England

Site location KENT DARTFORD SWANSCOMBE AND GREENHITHE Knock Hall Primary School Abbey Road

Postcode DA9 9XX

Study area 60.00 Square metres

Site coordinates TQ 592 747 51.4483538726 0.291297041434 51 26 54 N 000 17 28 E Point

Height OD Min: 30.95m Max: 31.14m

Project creators  
Name of Organisation Archaeology South East

Project brief originator Kent County Council

Project design originator Archaeology South-East

Project director/manager Diccon Hart

Project supervisor Deon Whittaker

Type of sponsor/funding body Developer

Name of sponsor/funding body developer

Project archives  
Physical Archive recipient Local Museum

Physical Contents 'Worked stone/lithics'

Digital Archive recipient Local Museum

Digital Contents 'none'

Digital Media available 'Images raster / digital photography'

Paper Archive recipient Local Museum

Paper Contents 'none'

Paper Media available 'Context sheet','Drawing','Unpublished Text'  
Project bibliography 1

Publication type Grey literature (unpublished document/manuscript)

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**APPENDIX 1:**

**KNOCKHALL SCHOOL, GREENHITHE  
(AS-E 3459):  
FIELD EVALUATION — AMENDED WITH CLAST REPORT  
(PALAEOLOGIC)**

2 October 2008

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ref: *BLUE: CC-040-A*

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**FIGURES**

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**APPENDICES**

**APPENDIX 1. PALAEO-LITHIC TEST PIT SUMMARIES**

**APPENDIX 2. CLAST LITHOLOGICAL REPORT: GRAVEL FROM KNOCKHALL SCHOOL,  
EYNSFORD ROAD, GREENHITHE (David Bridgland)**

## **SUMMARY**

Two deep test pits were dug to evaluate for Palaeolithic remains, one at each end of a 30 m evaluation trench. The upper c. 0.7 m of deposits at the site comprised clean gravel which was interpreted as made ground on the basis of contained Late Prehistoric flint artefacts and fire-cracked flint. Beneath this, undisturbed Pleistocene deposits were present at the west end of the evaluation trench, bottomed on to Thanet Sand at a depth of 4 m below the ground surface. There were also Pleistocene deposits present at the east end of the evaluation trench, but these seemed to have been affected by some sort of geological disturbance, and did not contain a well-defined terrace sequence.

Despite sieving 640 litres of gravel from the well-defined gravel bed at the west end of the trench, no artefacts were found.

The work at the site has provided a useful record of *in situ* terrace deposits in the key Swanscombe area. The deposits are probably attributable to the Swanscombe Boyn Hill terrace, probably mostly equivalent to the Lower Middle Gravel, despite the absence of archaeological finds.

Two gravel samples were taken for clast lithological analysis, by David Bridgland (Department of Geography, University of Durham). The results indicate a post-Anglian Thames gravel, which supports the suggested correlation above with the Swanscombe Lower Middle Gravel.

The lack of Palaeolithic artefactual or zoological remains suggests there is no need for further Palaeolithic investigation or recording.

## 1 INTRODUCTION

### 1.1 Project circumstances and scope of work

Construction of a new Child Centre building is taking place in the grounds of Knockhall Community Primary School, Greenhithe — henceforth, the Site. Due to the potential of the Site for Pleistocene deposits and Palaeolithic remains the Planning Archaeologist for Kent County Council required a specialist field evaluation of the nature and potential of any Palaeolithic remains at the site.

Fieldwork was carried out by Archaeology South-East, with the Palaeolithic/Pleistocene specialist Francis Wenban-Smith (Dept of Archaeology, University of Southampton), and took place on 28 May 2008.

### 1.2 Site location and topography

The site is centred on National Grid Reference (NGR) 559220 174660, and lies in an open grassed space in the centre of a built up housing area south of the A226 London Road between Dartford and Gravesend, northwest Kent (**Figure 1**). The ground surface was generally level at c.32 m OD, although the site area was on a slight plateau in relation to the surrounding grassed area immediately to the north. The area affected by the development covers a total area of approximately 0.25 hectares.

### 1.3 Background

#### *Pleistocene deposits*

The Site is situated close to the south bank of the Thames, between Dartford and Swanscombe. Although surrounded by previously quarried land, the Site is mapped by the British Geological Survey (1998) as unquarried. The BGS mapping shows the solid geology as Chalk or Thanet Sand, overlain by the Boyn Hill/Orsett Heath Pleistocene Formation.

The Boyn Hill/Orsett Heath Pleistocene formation is preserved on the south side of the Lower Thames as an intermittent east–west trending band from Dartford Heath through Dartford, Stone, Greenhithe and Swanscombe to Northfleet. The deposits in the formation consist of a sequence of predominantly fluvial loam, sand and gravel units laid down by the ancient Thames in the post-Anglian interglacial period between c. 430,000 and 350,000 years BP (Before Present), corresponding with late Marine Isotope Stage 12 to early MI Stage 10 of the global framework. These are overlain in places by younger colluvial and solifluction deposits, cutting down through them and filling northward-trending dry valleys and minor tributaries, which sometimes also contain their own systems of post-Boyn Hill/Orsett Heath fluvial deposits.

#### *Palaeolithic finds*

The Boyn Hill/Orsett Heath formation is rich in significant Palaeolithic archaeological remains, with numerous locations having produced artefacts, faunal remains and other biological evidence relating to climate and environment (Wymer 1968; Wessex Archaeology 1993). There are several major sites in the immediate vicinity of the Site, the most important of which are Barnfield Pit, the Globe Pit Greenhithe and Dierden's Yard.

Barnfield Pit is only a few hundred metres southeast of the Site and is recognised as a site of international archaeological significance, as well as being a designated SSSI on Quaternary geological grounds. It was one of the first Palaeolithic sites in Britain to be excavated in a controlled manner, and has been regularly reinvestigated subsequently (Conway *et al.* 1996). The deposits at the site contained lithic and faunal remains in stratified fluvial sand and gravel units, accompanied by biological palaeo-environmental evidence (**Table 1**). Undisturbed horizons preserving intact evidence of Lower Palaeolithic activity were present in one of the lower deposits — the Lower Loam. And one horizon within the middle phase of the sequence — the Upper Middle Gravel — has also produced an

early human fossil skull (the Swanscombe Skull) making it one of only two sites in England with Lower or Middle Palaeolithic hominid skeletal evidence.

<i>Phase</i>	<i>MI Stage</i>	<i>Stratigraphic unit</i>	<i>Height OD</i>	<i>Palaeolithic archaeology</i>
III	10–8?	Upper Gravel	c. 33–34m	Report of Levalloisian-like flakes at base of Upper Gravel (Smith & Dewey 1914)
	11–10	Upper Loam	c. 32–33m	Occasional ovate handaxes, often with twisted profiles and tranchet sharpening, debitage — "Acheulian"
	11–10	Upper Sand	c. 29.5–32m	None known
II	11	Upper Middle Gravel	c. 28.5–32m	Mostly pointed handaxes with thick partly trimmed butts, often large and well-made but also small and crude, cores, debitage and <i>ad hoc</i> flake-tools — "Acheulian" (Swanscombe Skull level)
		Lower Middle Gravel	c. 26.5–28.5m	
I	11	Lower Loam	c. 25–26.5m	Cores, debitage, <i>ad hoc</i> flake tools, and very occasional crude proto-handaxes — "Clactonian"
		Lower Gravel	c. 22–26.5m	

**Table 1.** *Stratigraphic and archaeological summary of Barnfield Pit sequence, Swanscombe*

The Globe Pit lies 400 m to the west of the Site and, although not subject to the same intensity of investigation or detail of recording as Barnfield Pit, has also produced numerous artefacts, including a series of ovate handaxes differing from the pointed types characteristic of the Middle Gravels at Barnfield Pit. The artefacts seem mostly to have come from a thick deposit of brickearth, overlying a sand and gravel deposit possibly equivalent (on purely altitudinal grounds) to the Barnfield Pit Lower Middle Gravel.

The site at Dierden's Yard was only 250 m to the east of the Site. The site, first discovered and investigated in c. 1900 by Henry Stopes (H. Stopes 1900; C. Stopes 1903) then subsequently re-investigated by RA Smith and H Dewey (Smith & Dewey 1914) is best known for the presence of its calcareous "Shell-bed", rich in molluscan and faunal remains. Many Palaeolithic artefacts were also recovered from the site, including finely made ovates and twisted ovates, as well as a Clactonian industry. The absence of reliable records means it is uncertain what the full stratigraphic sequence at the site was, and how the Shell-bed relates to the artefacts found. However, there is no doubt of its importance, and it is likely that undisturbed parts of the site are still present in the vicinity.

#### *Overview of background potential*

The Site was thought likely to contain Pleistocene deposits of the Boyn Hill/Orsett Heath formation. Significant Palaeolithic remains have been found at several nearby sites in this same stratigraphic and topographic situation (particularly Barnfield Pit, Dierden's Yard and Globe Pit, Greenhithe). Therefore it was necessary to carry out a specific Palaeolithic evaluation to evaluate the nature and significance of any Palaeolithic remains.

## **2 AIMS AND OBJECTIVES**

The primary aims of the field evaluation were:

- To investigate for the presence of any Pleistocene deposits and Palaeolithic remains

- To establish their nature and distribution, if present
- To assess their significance, if present

More specifically, the work aimed to:

- Determine the presence and potential of lithic artefact and vertebrate remains
- Determine the presence and potential of other biological/palaeo-environmental remains
- Determine the presence of, or potential for, undisturbed primary context Palaeolithic occupation surfaces
- Develop an understanding of the sequence, sedimentological character and 3-dimensional geometry of any Pleistocene deposits
- Interpret the mode of formation of any Pleistocene deposits
- Interpret the depositional and post-depositional history of any artefactual or biological remains
- Establish chrono-stratigraphic correlations of any Pleistocene deposits with regional sequences and the national framework
- Assess in local, regional and national terms, the significance of any Pleistocene deposits and Palaeolithic remains encountered, and their potential to fulfil current research objectives, including their potential for dating

### **3 METHODS**

Two deep test pits (TP 1, TP 2) were excavated across the site (**Figure 1**), one at each end of the 30 m evaluation trench that was put in across it. Each test pit was dug by a JCB excavator, under the constant supervision of the Palaeolithic/Pleistocene specialist. A 1.8m wide toothless ditching bucket was used, and each test pit was one bucket-width wide, c. 4m long and c. 4m deep. The base of the Pleistocene sequence was reached at 4 m deep in the western test pit (TP 1), but not in the more easterly test pit (TP 2).

Each test pit was taken down in horizontal spits of 5–10cm, respecting the interface between sedimentary units when unit changes were encountered, under supervision of the recognised specialist who recorded the sequence of sedimentary units and determined sampling requirements as excavation progressed. Digital colour photographs were taken of a representative section of each test pit once excavated to its full depth.

When Pleistocene sediments suitable for on-site sieving were encountered, samples of 100 litres were numbered and set aside at regular intervals (every c. 25cm) as excavation progressed downward and dry-sieved on site through a 1cm mesh for recovery of lithic artefacts and biological evidence. Six samples were taken and sieved from clean, bedded gravels encountered in TP 1, but no samples were taken/sieved from TP 2. Two samples of 20 litres each were taken for clast lithological analysis from the gravels in TP 1, one from the upper gravel facies, the other from the lower.

### **4 RESULTS**

#### **4.1 Stratigraphy and distribution of sediments**

Three main groups (I-III) of Pleistocene deposits were found below the made ground (MG) and topsoil

(TS) (**Table 2**). Bedrock at the site is Tertiary Thanet Sand, which was reached 4 m below the ground surface in TP 1, at the western end of the evaluation trench.

Detailed descriptions of the sequence in each test pit are given as an appendix (**Appendix 1**); the depth and distribution of the main Pleistocene sediment groups across the site are shown (**Figure 2**), and are discussed below (**Section 5.1**).

<b>Sediment Group</b>	<b>Period</b>	<b>Deposit</b>	<b>Phase</b>	<b>Description</b>	<b>Interpretive notes</b>	<b>Test pits</b>
<i>TS</i>	<i>Modern</i>	<i>Topsoil</i>	-	<i>Dark brownish-grey silt/sand with cropped turf</i>	<i>Young maintained topsoil/turf</i>	<i>1, 2</i>
<i>MG</i>	<i>Modern</i>	<i>Made ground</i>	-	<i>Soft, uncohesive silty/sandy flint gravel</i>	<i>Probably early/mid 20<sup>th</sup> century landscaping</i>	<i>1, 2</i>
<i>III</i>	<i>Pleistocene</i>	<i>Variable clay-silt /sand /gravel</i>	-	<i>Variably gravelly sand/clay-silt with strongly involuted and contorted gravel beds and pockets</i>	<i>Reworking of terrace deposits, perhaps due to local bedrock subsidence</i>	<i>2</i>
<i>II</i>	<i>Pleistocene</i>	<i>Sandy clay-silt</i>	-	<i>Firm, slightly sandy clay-silt</i>	<i>Possibly fluvial alluvium? Possibly colluvium?</i>	<i>1</i>
<i>I</i>	<i>Pleistocene</i>	<i>Sandy gravel (upper)</i>	<i>B</i>	<i>Moderately soft and loose sandy flint gravel</i>	<i>Fluvial activity, steady moderate/high energy</i>	<i>1, 2</i>
		<i>Sandy gravel (lower)</i>	<i>A</i>	<i>Soft and loose sandy flint gravel, well-bedded, with beds of pure sand and VF-F flint pebbles</i>	<i>Fluvial activity, fluctuating low/high energy</i>	<i>1, 2</i>
<i>T</i>	<i>Palaeocene</i>	<i>Thanet Sand</i>	-	<i>Slightly silty olive-brown fine sand</i>	<i>Tertiary estuarine deposition?</i>	<i>1</i>

**Table 2.** Major sediment groups, in stratigraphic order from base

*I* — *Sandy gravel*

This deposit was present at the base of the Pleistocene sequence in both TP 1 and TP 2. In TP 1, it could be divided into an upper and lower facies. The lower facies (Ia) was 1.75 m thick with its base at 27.65 m OD, with well-developed sand and gravel beds. This facies was divided from the upper facies by a Mn and Fe pan horizon at c. 29.40 m OD. The upper facies was c. 1.25 m thick and lacked clear bedding, but was



nonetheless a moderately well-sorted, and moderately soft and loose flint gravel. Its upper surface occurred at c. 30.15 m OD, and was broadly horizontal within the confines of the test pit, where it formed a clear and sharp boundary the overlying sandy clay-silt (II). In TP 2, the deposit could not be divided into separate facies, but occurred below c. 2.5 m below the ground-surface, where it had a truncated junction with the overlying reworked mixed deposit (III - cf below).

Both phases probably represent fluvial deposition. The higher proportion of coarser flint nodules interspersed with bed of pure sand and gravel in the lower phase IA indicate a generally higher but fluctuating energy of deposition than for the more homogenous bed IB, which indicates a steadier moderate/high depositional energy.

### *II — Sandy clay-silt*

This deposit only occurs in TP 1, at the west end of the evaluation trench. It overlies the upper gravel facies, with a broadly horizontal junction at c. 30.15 m OD, 1.50 m below the ground surface. The top of the deposit occurs c. 0.70 m below the ground surface, at c. 31 m OD. This deposit is not present in the east end of the evaluation trench (TP 2). This deposit may have been alluvially laid, representing over bank flooding and quieter water conditions than the underlying gravel. Alternatively, it may represent colluvial slopewash deposition.

### *III — Variable clay-silt/sand/gravel*

This deposit only occurs in TP 2, at the eastern end of the evaluation trench. It includes contorted and involuted gravel beds and pockets within a sand/clay-silt matrix, itself with a variable gravel content. It results from mixing and reworking of pre-existing deposits I and II, perhaps caused by local subsidence in the underlying bedrock

## **4.2 Sieve-sampling and Palaeolithic finds**

No flint artefacts were found. Six 100-litre gravel samples (0.6 cubic metres) were sieved on site from fluvial gravel deposits of facies Ia and Ib from TP 1 for artefacts and large faunal remains (**Table 3**). In addition to this targeted sieving, 20 litres from each facies was processed for clast lithological analysis, which provides a further opportunity for recovery of any lithic artefacts present in the clast lithological samples.

<i>Test pit</i>	<i>Context</i>	<i>Deposit</i>	<i>Sed Grp</i>	<i>Phase</i>	<i>Sample/s</i>	<i>Vol. (lit.)</i>	<i>Finds</i>
1	104a	Sandy gravel	I	B	1.1 1.2 1.3	100 each sample	None
	104b	Sandy gravel	I	A	1.4 1.5 1.6	100 each sample	None

**Table 3.** *Sieve-sampling and finds summary*

## **4.3 Biological/palaeo-environmental remains**

No large vertebrate faunal remains were found in the on-site sample sieving; nor were any sediments encountered with potential for small vertebrate or other micro-palaeontological remains.

#### 4.4 Dating

No direct dating evidence was recovered. Although sand sediments were discovered, they are likely to be too old for OSL dating, so no samples or in situ sediment dose-rate readings were taken for this purpose. Interpretation of the date of the sediments found relies, therefore, upon geological correlation with nearby sequences; supported by clast lithological analysis. This is discussed further below (**Section 5.1**).

#### 4.5 Clast lithological analysis

Two samples were taken for clast lithological analysis of the deposit I gravels, one from the upper facies (I-B) and the other from the lower facies (I-A). The results (**Appendix 2**) confirmed that both facies were laid down by a major river channel — in this case, obviously the Thames — after the Anglian glaciation, which lasted for c. 60,000 years between c. 480,000 and 420,000 BP. Both are somewhat richer in southern material and poorer in exotics than average, but these characteristics can probably be put down to random variation. Since both the samples from the Site are similar, it is possible that they reflect enhancement, due to incomplete mixing, of south-bank tributary material (probably from the Darent).

### 5 DISCUSSION AND CONCLUSIONS

#### 5.1 Stratigraphy, correlation and dating

**Figure 2** shows the test pits dug at the Site in relation to key comparator sequences in the region, namely: Barnfield Pit, Swanscombe (Conway *et al.* 1996); Swan Valley School (Wenban-Smith & Bridgland 2001); Bexley Hospital (Pre-Construct Archaeology 2003); Wansunt Pit (Oxford Archaeology 2002); and Dartford Fastrack/Dartford FC (Oxford Archaeology 2005; Allen & Wenban-Smith 2006). The most representative stratigraphic sequence is preserved beneath the west side of the site, as seen in TP 1. The deposits at the east side of the site (as seen in TP 2, and evident in the gravel-filled fissures in the floor of the evaluation trench) seemed to have undergone Pleistocene disturbance and reworking.

It shows that the deposit I gravels occur at roughly the same level as the junction of the Swanscombe Lower Middle Gravel with the Upper Middle Gravel at Barnfield Pit. The latter deposit, however, is generally a gravelly sand rather than a true gravel, so the most likely correlation is with the Lower Middle Gravel, although it may alternatively be a very gravelly facies of the Upper Middle Gravel. These deposit are both reliably correlated with the post-Anglian Hoxnian interglacial, c. 400,000 BP (Bridgland 1994).

However, the base of the deposit I gravel is also only c. three metres lower than the base of the Dartford Heath gravels at Bexley Hospital and Dartford FC, so it is also possible, on altitudinal grounds, to suggest correlation with these deposits, which are thought to date to the Anglian glaciation or earlier, before 425,000 BP.

This uncertainty was addressed by clast lithological analysis of the gravels at the Site (**Appendix 2**), which identified exotic lithologies introduced by the Anglian ice, and confirmed a post-Anglian Thames origin for the gravel. This in turn confirms correlation with one or other of the Lower Middle Gravel and Upper Middle Gravel.

The sand/clay-silt deposit (II) directly overlies the gravel (I), and is therefore obviously younger, although by how much is uncertain.

The mixed sand/clay-silt/gravel deposit (III) post-dates deposit II, but is also without a doubt of Pleistocene origin. Just how much younger is again uncertain; if the deposit was formed, as suggested, by substance of the underlying bedrock, this could have occurred substantially later.

#### 5.2 Lithic artefacts: recovery and depositional history

No lithic artefacts were found.

### **5.3 Presence of/potential for undisturbed Palaeolithic remains**

The only horizon with any possible potential for undisturbed Palaeolithic remains is the top surface of gravel deposit I, where it is covered by the fine-grained sandy clay-silt (II). However, no artefacts or other evidence of Palaeolithic occupation were found at this horizon, and it is not thought likely that any such evidence is present at the Site.

### **5.4 Significance, potential and priorities for further investigation**

No Palaeolithic archaeological remains were found, despite sieving 600 litres of gravel. This is probably sufficient to demonstrate the lack of artefactual remains in this gravel at this location. It is important to try and date the gravel more accurately so that this negative result can be integrated with the evidence of occupation (or lack of it) at other sites in the Swanscombe region, to create an overall picture of the distribution of Palaeolithic occupation. However, there is nothing more that can be done at the site to achieve this end. The only thing that can be done is to pursue clast lithological analysis of the gravel samples taken for that purpose, and this is currently in progress.

If there is a major impact by development into the surface of the gravel 1.50 m below the present ground surface in the western half of the site, then a monitoring visit to check that no Palaeolithic remains are present at this horizon is recommended. Otherwise, no further work is required from the Palaeolithic archaeological perspective.

## **REFERENCES**

- Allen, P. and Wenban-Smith, F. 2006. *Dartford Fastrack (Section C): Palaeolithic/Pleistocene Investigations*. Unpublished report submitted to KCC.
- Bridgland, D.R. 1994. *Quaternary of the Thames*. Chapman & Hall, London.
- British Geological Survey. 1998. *Dartford: England and Wales Sheet 271, Solid and Drift Geology*. 1:50,000 Series. Keyworth, Nottingham: British Geological Survey.
- Conway, B.W., McNabb, J. & Ashton, N., (ed's). 1996. *Excavations at Barnfield Pit, Swanscombe, 1968–72*. British Museum Occasional Paper 94. London: British Museum Press.
- Oxford Archaeology. 2002. *Wansunt Pit, Crayford: Post-excavation Assessment*. Unpublished report submitted to KCC.
- Oxford Archaeology. 2005. *Dartford Football Club, Dartford, Kent: Field Evaluation Report (Palaeolithic)*. Unpublished report submitted to KCC.
- Pre-Construct Archaeology. 2003. *Bexley Hospital (phase III site) Dartford: Field Evaluation Report (Palaeolithic)*. Unpublished report submitted to KCC.
- Smith, R.A. & Dewey, H. 1914. The High Terrace of the Thames: report on excavations made on behalf of the British Museum and H.M. Geological Survey in 1913. *Archaeologia* 65: 185–212.
- Stopes, C. 1903. Palaeolithic implements from the shelly gravel pit at Swanscombe. *British Association for the Advancement of Science* 73 (Southampton): 803–804.
- Stopes, H. 1900. On the discovery of *Neritina fluviatilis* with a Pleistocene Fauna and Worked Flints in High Terrace gravels of the Thames valley. *Journal of the Royal Anthropological Institute* 29 (New Series, 2): 302–303.

Wenban-Smith, F.F. & Bridgland, D.R. 2001. Palaeolithic archaeology at the Swan Valley Community School, Swanscombe, Kent. *Proceedings of the Prehistoric Society* 67: 219–259.

Wessex Archaeology. 1993. *The Southern Rivers Palaeolithic Project, Report No. 2 — The South West and South of the Thames*. Wessex Archaeology, Salisbury.

Wymer, J.J. 1968. *Lower Palaeolithic Archaeology in Britain as represented by the Thames Valley*. John Baker, London.