

Wansunt Pit Crayford



Post Excavation Assessment



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WANSUNT PIT LOWER PALAEO LITHIC SITE,
CRAYFORD

POST-EXCAVATION ASSESSMENT AND UPDATED PROJECT
DESIGN

OA
August 2002

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SUMMARY

Archaeological excavation and concurrent geological investigations took place at Wansunt Pit between June and August 2000 in advance of housing development by Taywood Homes. Deposits at Wansunt Pit (the Wansunt Loam) have previously produced important Palaeolithic archaeological and Pleistocene geological evidence. This assessment report considers both investigations and presents an integrated approach to further analysis and reporting.

The area under archaeological investigation at the eastern edge of Wansunt Pit contained no remnant of the Wansunt Loam. The upper part of the Pleistocene Dartford Heath Gravel was seen, overlain by a sedimentary unit 50–80 cm thick of banded sands and sandy silts, probably of Pleistocene colluvial origin, and sloping downhill to the north, parallel to the existing ground surface. A few derived and transported Palaeolithic artefacts were found in the upper part of the Dartford Heath Gravel. The archaeological excavation also led to the exposure of a sequence of colluvial and possibly also ploughed Holocene deposits containing a range of lithic and pottery evidence from the Neolithic and maybe also subsequent periods.

The geological investigations exposed Pleistocene sediments, including the Wansunt Loam, at several locations in the eastern part of the quarry. Twelve Palaeolithic artefacts (all flint flakes) were found in the Wansunt Loam at one location (Geological Section 1). These were mostly in very sharp condition, suggesting a minimum of disturbance, and two of them refitted, supporting the notion that there is an undisturbed occupation horizon at this location.

In combination the Palaeolithic archaeological and Pleistocene geological data from the two projects can make a significant contribution to national Palaeolithic research, with the potential to:

- build up a fuller picture of the nature, formation process, sequence and date of the various Pleistocene deposits in the eastern part of the Wansunt Pit, with particular reference to the Wansunt Loam;
- improve our understanding of the Palaeolithic artefactual content of the Pleistocene deposits, with particular reference to the distribution of material and the degree of its disturbance in the Wansunt Loam;
- contribute to current debate on the relationship between raw material and Palaeolithic handaxe typology, and the modelling of Palaeolithic behaviour in the landscape in relation to resource distribution.

The post-Palaeolithic data recovered from the main archaeological excavation site is of purely local significance, reflecting the range of Holocene periods during which there is evidence of occupation in the site area.

1. INTRODUCTION

1.1 Project background

1.1.1 Archaeological excavation took place at Wansunt Pit from June to August 2000 in advance of housing development by Taywood Homes, in response to a brief prepared by English Heritage (GLAAS 2000). The housing development is situated within a previously excavated area of the Wansunt Pit quarry, but necessitated destruction for an access road of a thin strip of unquarried land. Wansunt Pit has been designated a Site of Special Scientific Interest (SSSI) on Quaternary geological grounds and the Pleistocene deposits at the site are believed to contain undisturbed *in situ* Lower Palaeolithic archaeological horizons, making it of national importance for Palaeolithic research. The excavation started in June 2000 and was completed in August 2000.

1.1.2 The archaeological excavation of the access road area ran concurrently with geological investigation of the margins of the quarried area by a separate team commissioned by English Nature. This assessment report considers both investigations and presents an integrated approach to further analysis and reporting.

1.2 Geology and topography

1.2.1 Wansunt Pit (TQ 513738) is located at the western outskirts of Dartford, immediately to the south of Crayford, Kent (Figure 1). The area affected by the access road and hence subject to archaeological investigation was located at the eastern edge of the quarry, comprising a thin strip of deposits measuring *c* 25 m north-south and 4 m west-east separating the quarried area from Station Road (Figure 2). Concurrent geological investigations took place in adjacent areas not directly affected by the access road, in the eastern extension of the main Wansunt Pit quarry.

1.3 Palaeolithic archaeological background

1.3.1 The Wansunt Pit was mostly quarried in the first half of the 20th century. It is located on the north-eastern edge of the spread of Pleistocene deposits that underlies most of Dartford and Dartford Heath forming a plateau whose surface varies between *c* 35 m and 45 m OD. These deposits form a variable sequence measuring up to 20 m deep in places, broadly consisting of three groups of deposits, from the base

1) fluvial gravels and gravelly sands (the Dartford Heath Gravel),

2) finer grained loams, silts and clays (the Wansunt Loam)

3) an overlying sloping sheet of unstratified loamy gravel usually interpreted as later colluvium.

1.3.2 The basal part of the Wansunt Loam was a stiff, homogenous dark reddish brown clay, and its upper part was a coarser clayey silt with horizontal stratification. The Wansunt Loam was up to 3 m thick in the northern parts of the Wansunt Pit but thinned and disappeared in its southern and eastern parts, where it was observed to be banked against an underlying fluvial gravel (Chandler and Leach 1911, 1912; Smith and Dewey 1914; Bridgland 1994).

1.3.3 The deposits at Wansunt Pit have produced important Palaeolithic archaeological evidence (Chandler and Leach 1912; Leach 1913; Smith and Dewey 1914; Wymer

1968; Wessex Archaeology 1993). Occasional abraded handaxes and flakes have been found in the Dartford Heath Gravel underlying the Wansunt Loam, but the most significant finds have come from the Wansunt Loam itself, which has produced over 40 handaxes and many flakes since it was first recognised. Most of the artefacts are in mint condition and several refitting flake groups were found. According to Chandler and Leach, artefacts were most common in the upper part of the Wansunt Loam (stratified clayey silt), but they occur throughout, as well as from the overlying colluvium, although these latter were probably mostly derived from the underlying Wansunt Loam. The handaxes from the site are mostly bluntly pointed ovate in shape, often with twisted profiles and/or tranchet sharpening. Faunal remains have also been reported in the deposits at Wansunt Pit, albeit sparse and not since the early 20th century. Elephant (*Palaeoloxodon antiquus*), red deer (*Cervus elaphus*), horse (*Equus caballus*) and bovid (*Bos* sp.) were reported from the Dartford Heath Gravel, and fragments of horse and bovid teeth in poor condition were recovered from the upper stratified part of the Wansunt Loam.

- 1.3.4 Recent fieldwork at Wansunt Pit (White *et al.* 1995) has demonstrated the survival of undisturbed Pleistocene deposits including the Wansunt Loam around the edge of the quarried out area in the eastern part of the site, and has confirmed the previously reported pattern of richness of the Wansunt Loam in artefacts. Two artefacts were recovered from the base of the Wansunt Loam and six from the upper silty facies (including one handaxe), all from cleaning a single, stepped section measuring c 2 m wide x 4 m high.
- 1.3.5 The area around Wansunt Pit is also rich in Palaeolithic evidence. The site of Bowman's Lodge is located 200–300 m to the east (Tester 1951). The Palaeolithic industry from this site was collected from the base of a deposit similar to the lower Wansunt Loam (a stiff reddish clay containing scattered pebbles and small fragments of water worn flint) that overlay the Dartford Heath Gravel on a surface sloping gently down to the east from 18-23 m OD. The lithic collection from this horizon contained well-made ovate handaxes, typologically similar to those from the Wansunt Loam, in association with numerous cores and less carefully shaped handaxes as well as debitage. The correlation of the deposits at Bowman's Lodge with those at Wansunt Pit is uncertain (other than for the underlying Dartford Heath Gravel) although it was suggested by Tester that the overlying loams are equivalent, representing deposition by the main River Thames at the end of the Swanscombe interglacial, following deposition of the Boyn Hill/Orsett Heath gravel formation.
- 1.3.6 Although the Dartford Heath Gravel at Wansunt Pit and Bowman's Lodge only contains occasional Palaeolithic artefacts, many have been found 1–2 km to the east, in the gravels underlying Dartford (Wessex Archaeology 1993). Nine separate find-spots are known, including the prolific site of Pearson's Pit, which produced over 60 handaxes, and a further 125+ handaxes are recorded from gravels in the general Dartford/Dartford Heath area.
- 1.3.7 The dating and correlations of the Dartford Heath deposits with other gravel deposits in the Lower and Middle Thames regions has long been, and continues to be, the subject of controversy (Bridgland 1994). In essence, the debate concerns whether the thick deposits at Dartford Heath represent a single formation equivalent to the Boyn Hill/Orsett Heath formation prevalent as an east-west series of terrace patches in this part of northern Kent, or whether two separate formations abut each other within the Dartford Heath deposits, the lower of them correlating with the Boyn Hill/Orsett Heath formation and the upper of earlier date.
- 1.3.8 In either case the Boyn Hill/Orsett Heath formation is represented within the Dartford Heath gravels. This formation consists of a sequence of predominantly

fluviatile loam, sand and gravel units laid down by the ancient River Thames in the post-Anglian interglacial period between *c* 450,000 and 350,000 BP (late Oxygen Isotope Stage 12 to early Oxygen Isotope Stage 10) and can be traced up and down the Thames Valley (Bridgland 1994). The formation is generally rich in significant Palaeolithic archaeological remains; quarrying activity at numerous locations beyond Dartford Heath has also produced artefacts, faunal remains and other biological evidence relating to climate and environment (Wymer 1968; Wessex Archaeology 1993). Particularly notable among these is the site at Barnfield Pit, Swanscombe *c* 10 km to the east, which also produced an early human skull from one unit within the formation (Upper Middle Gravel), making it one of only two sites in England where human remains of this antiquity have been recovered.

- 1.3.9 Recent investigations (White *et al.* 1995) suggested that the Wansunt Loam thins and disappears in the eastern part of the Wansunt Pit, but that some of the deposit was still present in the section to be removed for construction of the access road. Therefore archaeological work was commissioned to excavate and record any Palaeolithic archaeological evidence in advance of construction.

2. AIMS AND OBJECTIVES

2.1.1 The general aims of the archaeological work were laid down in the project specification as follows:

- to compile a permanent record of the archaeological development of the site;
- to relate it to the surrounding archaeological and geological environment;
- to analyse and study the recorded data and finds made;
- to disseminate the results by publishing illustrated reports and other appropriate means.

2.1.2 Specific objectives were defined as follows:

- Artefact taphonomy. To examine whether any artefacts found are undisturbed *in situ*.
- Palaeoecology. To attempt to recover environmental and faunal data to examine the palaeoecology of the area.
- Natural resource exploitation. To examine the exploitation of natural resources in the area, in relation to both biological resources and lithic raw material availability and procurement.
- Dating. To establish the date of the Wansunt Loam and attempt to gauge the length of human use of the site.
- On-site activity. To identify specific activities carried out on site and to investigate for discrete intra-site activity areas.
- Behaviour. To examine the data gathered from the site in the context of other sites in the region such as Swanscombe and Stoke Newington, with particular reference to contemporaneity and activity patterns.
- Site formation processes. To establish the mode of formation and depositional environment of the deposits present at the site.
- Regional correlation. To consider the correlation of the deposits at the site with the previous investigations of the Wansunt stratigraphy, and to place the site into the geomorphological context of the Lower Thames Valley.

2.2 Fieldwork methodology and summary of excavation results

Archaeological investigations

2.2.1 The area under investigation was cleared of brush and undergrowth. The west-facing section was then cleaned by hand and the stratigraphic sequence recorded. This enabled identification of the surface of the Dartford Heath Gravels and of the horizons where Wansunt Loam might be present. The site was then divided into six areas (A–F), divided by 1 m wide baulks (Figure 3). Each area was stripped by mechanical excavator to just above the top of the Pleistocene sequence. The north-facing sections of each baulk were then recorded, and then the baulks machined down to the same level.

2.2.2 Excavation of areas A–F then proceeded down towards the Pleistocene sediments by hand. A substantial collection of Holocene archaeological finds, including pottery, fire-cracked flint and lithic artefacts, was recovered from hand excavation of the basal Holocene sediments overlying the Pleistocene sequence; no Holocene archaeological features were found however. The context and precise location of all Holocene artefacts were recorded. Once the base of the artefact-bearing Holocene sediments was reached excavation proceeded into the Pleistocene sediments by a combination of hand excavation and machining. Half of each area was hand-excavated in 5 cm spits, and once it was established that no artefacts or Wansunt Loam was present, the other half was carefully machined down. This methodology

was developed on site with approval of English Heritage as a result of the lack of Palaeolithic finds and to avoid wasting too much time on hand excavation of swathes of archaeologically sterile sediment. Initially hand excavation of the Pleistocene sediments was exclusively by trowel. As excavation progressed, and in light of the absence of finds, the excavation method changed to delicate use of a mattock accompanied by sieving of all spoil through a 1 cm mesh. If any artefacts had been found, trowelling would have resumed, but this did not prove necessary.

- 2.2.3 Baulks were left upstanding between each excavated area to provide an orthogonal record of the stratigraphy transverse to the main north–south section. These were recorded as excavation progressed downward.
- 2.2.4 A detailed programme of sampling for magnetic susceptibility was carried out as excavation progressed. Sediment samples were taken on a regular grid system from each hand-excavated spit, leading to a total of 417 samples being taken for this purpose.
- 2.2.5 At the end of the project, monolith samples were taken through the Pleistocene sediments overlying the Dartford Heath Gravel in Area F, and samples for OSL dating were taken at two locations in Area B, one in the top part of the Dartford Heath Gravel, and one in the overlying finer-grained sediments.

Geological investigations

- 2.2.6 Several sections were cleared around the edge of the quarried area to the west of the archaeological site in order to try and gather more information on the 3-dimensional geometry of the Pleistocene deposits, and establish the relationship of the deposits under geological investigation with those exposed by the archaeological excavation. Several trial pits were also excavated by machine to establish the depth of the Dartford Heath Gravel at different points. The main geological section (Geological Section 1 — Section 1 *sensu* White *et al.* 1995) was re-investigated and cleaned by hand-excavation, leading to the recovery of several lithic artefacts from the Wansunt Loam at this location.
- 2.2.7 A bulk sediment sample for biological evidence was taken from the upper stratified part of the Wansunt Loam in Geological Section 1. A monolith tin and an OSL dating sample were also taken from the upper stratified sediments, and a second OSL dating sample was taken from the base of the Wansunt Loam at Geological Section 1, just above the Dartford Heath Gravel.

Summary of excavation results

- 2.2.8 The area under archaeological investigation contained no remnant of the Wansunt Loam. The upper part of the Pleistocene Dartford Heath Gravel was seen, overlain by a sedimentary unit 50–80 cm thick of banded sands and sandy silts, probably of Pleistocene colluvial origin, and sloping downhill to the north parallel to the existing ground surface.
- 2.2.9 The Pleistocene sequence was overlain by a series of Holocene loams, probably mostly of colluvial origin, and with their upper part affected by ploughing, dating from any period from Neolithic to post-medieval. These in turn were overlain by modern 20th-century dumped deposits.
- 2.2.10 A few small and abraded Palaeolithic artefacts were recovered from the top part of the Pleistocene gravel deposits. A substantial collection of Holocene artefacts, including pottery, fire-cracked flint and lithic artefacts, was recovered from the basal Holocene sediments overlying the Pleistocene sequence. No associated Holocene archaeological features were found, however, and the deposits containing

the artefacts were regarded as of Holocene colluvial origin and probably affected by prehistoric ploughing and slope movement. The lithics were Neolithic and Bronze Age and the pottery was all post-Roman in date.

- 2.2.11 The geological investigations exposed Pleistocene sediments, including the Wansunt Loam, at several locations around the eastern quarry extension, providing extra information on their geometry, and clarifying their relationship with those excavated archaeologically at the eastern site margin. Twelve Palaeolithic artefacts (all flint flakes) were found in the Wansunt Loam at Geological Section 1. These were mostly in very sharp condition, suggesting a minimum of disturbance, and two of them refitted, supporting the notion that there is an undisturbed occupation horizon at this location.
- 2.2.12 No faunal remains or other biological evidence was recovered from either the archaeological excavation or the geological investigations. Sorting of the residues from a bulk sample of the upper stratified part of the Wansunt Loam at Geological Section 1 did not produce any small vertebrate or other biological evidence.

3. FACTUAL DATA AND QUANTIFICATION

3.1 Survey data

3.1.1 All section locations, samples and finds were recorded by total station, and stored as digital files.

3.2 Stratigraphy

Section drawings

3.2.1 Section drawings were made of the main west-facing north–south section of the archaeological site, and of the transverse sections across the site in the north-facing baulks of each excavation area. Drawings were also made of the west-facing sections of three representative excavation areas, and of the south-facing section of area A. Section drawings were also made as part of the geological investigations and these have been integrated into the archaeological archive. In total there are 31 section drawings, mostly at 1:20, from the archaeological and geological investigations (Table 1). All drawings are in pencil on drafting film.

Table 1: Section drawings

<i>Project</i>	<i>No. drawings</i>	<i>Scale</i>	<i>Size</i>
Archaeological excavation	2	1:20	A1
	17	1:20	A4
Geological investigation	3	1:25	A2
	4	1:50	A2
	4	1:20	A2
	1	1:20	A4

Context records

3.2.2 Each sedimentary unit on the main north–south archaeological section and on the transverse baulk sections for each excavation area was assigned a unique context number, and described on separate context sheets (Table 2). In total 56 contexts were assigned on the archaeological excavation. The stratigraphic order and correlations are summarised in Table 3. Contexts in the geological sections were not numbered.

Table 2: context number assignment

<i>Section</i>	<i>Context number assignment</i>
Main N–S section	1–14
Area A	50–55
Area B	100–106
Area C	150–156
Area D	200–207
Area E	250–254
Area F	300–308

Table 3: context number summary and correlations for excavated area (contexts 3, 8, 9, 10 and 11 are isolated lenses, cuts and fills at the north end of the main section; context 12 is the same as contexts 13 and 14 combined)

Main N-S section	A	B	C	D	E	F	Description	Interpretation
1	50	100	153	200	250	300	Loose sl. silty sand with ash, frag' modern cbm and patches weed and grass	Late 20th C topsoil and turf
2	51	101	152	201	251	301	Friable, mod. compacted reddish brownish yellow clay-silty sand with mod. common sub-angular f-c flint pebbles and occasional roots	Late 20th C dumping
	52	102	151		252	302		
		103	150					
4	53	104	156	201	253	304	Lightly compacted, friable yellowish brown clay-silty sand with angular to sub-angular f-c flint pebbles	Truncated topsoil subsoil
	54		155			305		
5	55	105	154	202		306	Loose and v. friable yellowish brown silty sand with occasional f-c flint and mod. common vf-m Chalk pebbles	Base of plough zone or worm-sorting horizon
6	55	106	154	206/ 207 203 204		307	Mod. compacted, friable yellowish brown sl. cl-silty sand with mod. frequent sub-angular to well rounded f-c flint pebbles	Holocene colluvium
7	-	-	-	205	254	308	Well compacted, friable pale brownish yellow sl. sandy silt with occ. f-c flint pebbles; alternates with bands of strong brown reddish yellow sl. cemented cl-silty f-c sand, dipping gently northwards parallel to current ground surface	Pleistocene colluvium (aka "Streaky bacon")
13	-	-	-	-	-	-	Layers of loose pale brownish yellow f-m sand alternating with well compacted sl-silty reddish brown sand; contains occ. thin trails of vf-m, occasionally c. sub-angular flint pebbles	Terminal Pleistocene fluvial phase, low/high energy deposition alternating
14	-	-	-	-	-	-	Mod. to well compacted reddish yellow, cross-bedded mod. to well sorted f-c sub-angular to well rounded flint gravel with occ. seams of brownish yellow m-c sand	High energy Pleistocene fluvial deposition

Sediment samples

3.2.3 Samples were taken from a range of the deposits encountered (Table 4). A series of small samples (1–417) for magnetic susceptibility studies were taken at a regular grid interval from each excavated spit of context 7, the uppermost Pleistocene deposit, thought at the time to possibly be the Wansunt Loam. Two monoliths (samples 422–423) were taken through contexts 7 and 13 at area F in the archaeological excavation, and one monolith (sample 426) was taken through the Wansunt Loam at Geological Section 1. A bulk sample of 30 litres (sample 429) was taken for investigation for small vertebrate and molluscan evidence from part of the Wansunt Loam at Geological Section 1. Several samples were also taken for OSL dating, discussed below.

Table 4: sediment samples

<i>Sample no.</i>	<i>Area</i>	<i>Context</i>	<i>Purpose</i>	<i>Size</i>
1–417	A–F	505	Magnetic susceptibility	100 g
418–419	B	7	OSL	Tube and 2 kg bag
420–421	B	13	OSL	Tube and 2 kg bag
422	F	7/13	Monolith	50 cm
423	F	13	Monolith	50 cm
424–425	Geological Section 1	Wansunt Loam	OSL	Tube and 2 kg bag
426	Geological Section 1	Wansunt Loam	Monolith	50 cm
427–428	Geological Section 1	Wansunt Loam	OSL	Tube and 2 kg bag
429	Geological Section 1	Wansunt Loam	Small vertebrates/molluscs	30 litres

Stratigraphic overview

- 3.2.4 The area under archaeological investigation contained no remnant of the Wansunt Loam. The upper part of the main Dartford Heath Gravel was seen at the base of the excavated deposits (context 14), overlain by a transitional deposit of bands of sand and gravel reflecting decreasing fluvial energy (context 13). This was overlain by a sedimentary unit 50–80 cm thick of banded sands and sandy silts with occasional trails of fine gravel (context 7), probably of Pleistocene colluvial origin, and sloping downhill to the north parallel to the existing ground surface.
- 3.2.5 A series of geological sections was dug between Geological Section 1 and the north end of the main archaeological excavation to clarify the relationship of the Wansunt Loam to the deposits seen in the archaeological excavated area. This established that the Wansunt Loam was stratigraphically interspersed between the top of the Dartford Heath Gravel (contexts 13/14) and the base of the banded sands and silts (context 7).
- 3.2.6 The Pleistocene sequence was overlain by a series of Holocene loams, the lowermost (context 6) probably of colluvial origin, and with their upper part affected by ploughing (context 4). These two deposits are divided by a thin layer rich in fine flint and Chalk gravel (context 5) that may represent the base of the plough-zone or a worm-sorting horizon. These deposits may date from any period from Neolithic to post-medieval. Context 4 is truncated by a series of modern 20th-century dumped deposits on which some shrubs and weeds have grown.

3.3 The artefactual record

Lithics

Quantity

3.3.1 The artefact counts from different parts of the site are summarised below (Table 5). The great majority of the artefacts are later prehistoric artefacts from the basal Holocene deposits in the main excavation. A few Palaeolithic artefacts were found by sieving the upper parts of the Dartford Heath Gravel at the main excavation. A relatively high number of Palaeolithic artefacts were found at Geological Section 1, considering they are from a light clean of the section.

Table 5: recovery of lithic artefacts by area and context group

<i>Site Area</i>	<i>Holocene contexts</i>	<i>Dartford Heath Gravel</i>	<i>Wansunt Loam</i>	<i>Not in situ</i>	<i>Total</i>
Main excavation	173	4	-	8	185
Geological Section 1	-	-	12	2	14
Geological Section 6	-	-	-	1	1
Total	173	4	12	11	200

Condition

3.3.2 The Holocene lithic artefacts are generally in fresh condition, although several are quite abraded. Several have also have been affected by fire-cracking due to burning. Three of the Palaeolithic artefacts from the Dartford Heath Gravel at the main excavation are slightly rolled, and the fourth is very rolled. Of the Palaeolithic artefacts from the Wansunt Loam at Geological Section 1, most of them (10 out of 12) are in mint or fresh condition, and the others are slightly or very rolled.

Provenance

3.3.3 The Holocene artefacts from the main excavation all come from the basal part of the Holocene colluvium, in areas affected by tree-rooting. Their variable condition and the lack of undisturbed debitage scatters suggest that they are not in an undisturbed horizon, but have been subject to some transport and disturbance. They are unlikely to be in their original position of discard, and are of low stratigraphic integrity, possibly containing diverse lithic elements of Mesolithic to Iron Age date.

3.3.4 The four Palaeolithic artefacts from the Dartford Heath Gravel at the main excavation are all in rolled condition, and have without doubt been transported from their original discard location by the river that laid down the gravel. The single more heavily abraded artefact may have been derived from an earlier deposit than the Dartford Heath Gravel, or may have just been transported further. The three less abraded artefacts are probably broadly contemporary with formation of the Dartford Heath Gravel.

3.3.5 Most of the flint artefacts from the Wansunt Loam at Geological Section 1 are in mint condition, and they come from three distinct horizons within the 3 m thickness of the deposit, one *c* 50 cm above its base, one *c* 1.10 m above the base, and the other *c* 2.10 m above. Two of the artefacts from the upper of these horizons refit to each other. There is a single more rolled artefact in each of the lower two horizons. These facts suggest that

the Wansunt Loam may include derived transported artefacts as well as undisturbed material. It is however possible that even mint condition and refitting material might have been transported downslope by colluvial processes without major separation (spatial and stratigraphic) or abrasion. Therefore although it is reasonable to suggest the Wansunt Loam contains undisturbed horizons, this cannot be confirmed on current information.

Range and variety

- 3.3.6 The Holocene artefacts include a range of cores, debitage and flake-tools. The cores range in size from fairly large (5–8 cm) to small (2–4 cm), generally globular and reflecting an unstructured *ad hoc* approach to flake production. The debitage is generally flakes, with no sign of any deliberate blade production. The tools are relatively rare, and are mostly convex scrapers, with a few miscellaneous flaked forms, retouched edges on small natural flint gravel pieces, and a leaf-shaped arrowhead. Several of the scrapers are neatly made, and they include a small convex "thumbnail" form, a large discoidal form and a broadly discoidal convex scraper with a relatively acutely retouched scraping edge. The arrowhead is diagnostically Neolithic, and the range of other flake-tool forms is typical of the Neolithic and Bronze Age, so the Holocene lithic collection represents local occupation in either the Neolithic alone, or both the Neolithic and Bronze Age.
- 3.3.7 The Palaeolithic artefacts from the Dartford Heath Gravel at the main excavation are all technologically undiagnostic waste debitage. Three of them (the less rolled ones) are of small size (2–3 cm long), and the fourth (more rolled) one is slightly larger (4–5 cm).
- 3.3.8 The 12 flint artefacts from the Wansunt Loam at Geological Section 1 are all debitage flakes. They include 8 which are in themselves technologically undiagnostic, and 4 (2 of which refit) which are recognisably from handaxe manufacture. Since both refitting of Palaeolithic handaxe debitage and experimental replication has shown that most debitage from handaxe manufacture is not in itself recognisable as such, it is likely that all these flakes are from handaxe manufacture.

Raw material

- 3.3.9 The raw material for all artefacts is flint. The Holocene collection is generally made from pebbles of dark glossy black flint, although there are also many examples made from more opaque grey and brownish flint pebbles. These would have been abundant in the local landscape. For the Palaeolithic assemblage from the Wansunt Loam the cortical patches on those waste flakes with any cortex remaining appear somewhat smoothed and abraded, suggesting that the flint raw material was not gathered direct from a Chalk bedrock source, but had already been subject to some geological derivation process and weathering.

Pottery

- 3.3.10 Nine pieces of pottery were found, all from the Holocene deposits in the main archaeological excavation. All of the pottery is post-Roman in date.

3.4 The environmental record

Faunal remains

- 3.4.1 Two conjoining pieces of probable human adult femur and two pieces of large bivalve shell, probably oyster, were found in the Holocene deposits in the main archaeological excavation.

Biological/palaeo-environmental sampling

- 3.4.2 No sign of biological evidence such as molluscs or small vertebrates was seen in any of the deposits encountered at the main section or in any of the geological sections. A bulk sample was taken and processed from a part of the Wansunt Loam exposed at Geological Section 1 containing wavy sub-horizontal clay-silt laminations, and sieved through a 0.5 mm mesh. No biological evidence of any sort was found.

3.5 Dating

- 3.5.1 The lithic artefacts from the Holocene sediments indicate a broadly Neolithic/Bronze Age date. For the Pleistocene sediments, a series of four OSL samples was taken, two from the main archaeological section (one from context 7 and one from context 13), and two from different horizons within the Wansunt Loam at Geological Section 1.

4. STATEMENT OF POTENTIAL

4.1 Survey data

4.1.1 The survey data will allow the creation of the basic site location plan and section line datums, and this needs to be integrated with the location of the various geological sections as part of the production of an overall summary report of archaeological work at the site.

4.2 Stratigraphy

4.2.1 The stratigraphic sequence at the main excavation is clearly understood. There remains uncertainty over the geometry of the Pleistocene deposits across the Wansunt Pit, the correlation of those at the main excavation with those in the various geological sections, and the relationship of the Wansunt Loam with the sequence at the main excavation. Integration of the sections and context descriptions recorded for the archaeological excavation with the data collected by the geological investigations should resolve these matters.

4.2.2 The monoliths through the upper Pleistocene deposits at the main excavation can be studied to investigate significant stratigraphic breaks, particle size and condition, and changes in magnetic susceptibility. For this reason, particularly in the absence of any artefactual evidence or other sign of Palaeolithic human presence, there is no potential for study of the gridded magnetic susceptibility samples.

4.2.3 In view of how these studies fit in with the aims of the geological investigations, it is suggested that these aspects of the project are incorporated at the post-excavation analysis phase with the geological investigations.

4.3 Lithic artefacts

4.3.1 The Holocene collection from the main excavation needs to be studied and its technology and typology summarised with a view to characterising the period of occupation represented in more detail than possible for this assessment.

4.3.2 The tiny Palaeolithic collection from the main excavation needs no further study, although its presence is significant in confirming a small artefactual component in the Dartford Heath Gravel, which establishes that it cannot predate the earliest known occupation of England.

4.3.3 The Palaeolithic artefact collection from the Wansunt Loam at Geological Section 1 is of more significance. The quantity found is relatively large for such a small volume of sediment cleared in the process of section cleaning. The distribution of artefacts needs to be compared with that from the previous phase of excavation at the site (White *et al.* 1995), to attempt to build up a fuller picture of whether artefacts are distributed at specific horizons within the deposit. The technological and cortical characteristics of the artefacts need to be studied in more detail to try and relate them to stages of handaxe manufacture and identify the raw material source, which could help in interpretation of human behaviour at the site, and in understanding the possible relationship/s between handaxe typology, site location, behaviour and raw material.

4.3.4 In view of their fundamental archaeological nature, it is suggested that post-excavation analysis of the lithics be completed as part of the post-excavation programme of the archaeological project.

4.4 Pottery

4.4.1 The small pottery assemblage is all post-Roman in date and therefore has no further potential.

4.5 Faunal remains

4.5.1 The tiny redeposited faunal assemblage has no potential for further analysis.

4.6 Dating

4.6.1 The only evidence recovered of dating relevance is the series of OSL samples. Analysis of these can provide indications of

i) the absolute ages of the main Pleistocene sediment bodies at the main excavation and Geo Section I;

ii) their correlation with each other.

4.6.2 The precision of OSL as a technique is sufficient to identify different stages within the marine Oxygen Isotope framework, which is the fundamental basis of Middle and Late Pleistocene chrono-stratigraphic correlation.

4.6.3 As this is a mainly geological objective, it is suggested that the OSL dating aspect of the project is incorporated at the post-excavation analysis phase with the geological investigations, which have already adopted OSL dating as a key approach.

5. STORAGE AND CURATION

5.1 Site archive summary

Table 6: site archive summary

<i>Type of record</i>	<i>Exists as</i>	<i>Quantity</i>	<i>Stored in</i>
Context records	A4 paper records	56	Held by Oxford Archaeology
Co-ordinate/ CAD data	Digital data	25 mb	Held by Oxford Archaeology
Section drawings	A4 pencil on drafting film	18	17 held by Oxford Archaeology 1 held by P. Allen
	A2 pencil on drafting film	11	Held by P. Allen
	A1 pencil on drafting film	2	Held by Oxford Archaeology
Lithic artefacts	Flint artefacts, individually washed and bagged, but not marked	200	Held by F. Wenban-Smith
Bone finds	Bone pieces, individually washed and bagged, but not marked	2	Held by Oxford Archaeology
Pottery finds	Pot sherds, individually washed and bagged, but not marked	9	Held by Oxford Archaeology
Shell finds	Shell fragments, individually washed and bagged, but not marked	2	Held by Oxford Archaeology
BW photographic records	Sheets of negative strips	4	Held by Oxford Archaeology
	Contact print sheets	4	Held by Oxford Archaeology
Colour photographic record	Mounted 35 mm slides	c 200	Held by Oxford Archaeology
Sediment samples	50 cm monoliths	2	Held by Oxford Archaeology
	Unprocessed samples of c 100 g	417	Held by Oxford Archaeology
OSL samples	Tubes and 2 kg background samples	4	Held by P. Allen

5.2 Conservation and storage requirements

- 5.2.1 There are no particular conservation requirements in the short and medium term as all parts of the archive are stable under dry conditions at room temperature.

6. UPDATED AIMS AND OBJECTIVES

6.1 Summary statement of potential

6.1.1 The area investigated by the archaeological excavation did not contain any of the Wansunt Loam, and did not produce any Palaeolithic artefacts from undisturbed contexts. The excavation did however produce a detailed record of the Pleistocene stratigraphy at the eastern edge of the Wansunt Pit, and four derived/transported Palaeolithic artefacts from the upper part of the Dartford Heath Gravel. Two OSL dating samples and two sediment monoliths were taken from the Pleistocene deposits. The archaeological excavation also led to the exposure of a sequence of colluvial and possibly also ploughed Holocene deposits containing a range of lithic and pottery evidence from Neolithic and maybe also subsequent periods.

6.1.2 The concurrent geological investigations produced records of the Pleistocene stratigraphy at several locations in the eastern part of the Wansunt Pit, and several (12) Palaeolithic artefacts from the Wansunt Loam at one location (Geological Section 1). The sharp condition of these artefacts and the fact that two of them refitted with each other support previous understanding that the Wansunt Loam contains undisturbed Palaeolithic archaeological horizons, making it a deposit of national importance for Palaeolithic archaeological investigation. One OSL dating sample and one sediment monolith were taken from Geological Section 1.

6.1.3 In combination the Palaeolithic archaeological and Pleistocene geological data from both the archaeological and geological projects can make a significant contribution to Palaeolithic research, with the potential to:

- build up a fuller picture of the nature, formation process, sequence and date of the various Pleistocene deposits in the eastern part of the Wansunt Pit, with particular reference to the Wansunt Loam;
- improve understanding of the Palaeolithic artefactual content of the Pleistocene deposits, with particular reference to the distribution of material and the degree of its disturbance in the Wansunt Loam;
- contribute to current debate on the relationship between raw material and Palaeolithic handaxe typology, and the modelling of Palaeolithic behaviour in the landscape in relation to resource distribution.

6.1.4 The post-Palaeolithic data recovered from the main excavation site is of purely local significance, reflecting the range of Holocene periods during which there is evidence of occupation in the site area.

6.2 Revised aims and objectives

6.2.1 The overall aims of the post-excavation analysis are summarised in Table 7.

Table 7: aims of the proposed analysis

<i>Aim</i>	<i>Description</i>
1	To establish the sequence, nature, date and mode of formation of the Pleistocene deposits investigated at both the archaeological site and the geological investigation locations
2	To analyse and interpret the Palaeolithic artefacts recovered at the archaeological site and the geological investigation locations
3	To identify the periods of post-Palaeolithic occupation represented in the finds recovered from the Holocene contexts at the main archaeological site
4	To report on the archaeological and geological results
5	To deposit the project archive in an appropriate institution

6.2.2 The data collected have the potential to address the following specific objectives as listed in Table 8.

Table 8: aims and objectives

<i>Aim</i>	<i>Objective</i>	<i>Details</i>
1	1.1	To establish the nature and sequence of Pleistocene deposits in the eastern part of the Wansunt Pit
	1.2	To establish the mode of formation of this sequence of deposits
	1.3	To establish the date of this sequence of deposits
	1.4	To relate the Pleistocene sequence at Wansunt Pit to the wider regional and national chrono-stratigraphic framework
2	2.1	To identify the presence and distribution of Palaeolithic artefacts in the Pleistocene sequence
	2.2	To contribute to current debate on the relationship between raw material and Palaeolithic handaxe typology
	2.3	To contribute to the modelling of Palaeolithic behaviour in the landscape in relation to resource distribution
3	3.1	To identify the periods of post-Palaeolithic occupation represented in the finds recovered from the Holocene contexts at the main archaeological site
4	4.1	To report on the Pleistocene geological and Palaeolithic archaeological results
	4.2	To report on the Holocene archaeological evidence
5	5.1	To deposit the project archive in an appropriate institution

7. PUBLICATION, REPORTING AND DISSEMINATION

- 7.1.1 There is considerable overlap of data and objectives between the archaeological and geological investigations, therefore it has been agreed with P. Allen (director of the geological investigations on behalf of English Nature) that post-excavation analysis and reporting be divided between the archaeological and geological investigations commensurate with the main objectives, skills and experience of the archaeological and geological teams.
- 7.1.2 It is proposed that the main final report be produced by the geological team, under the direction of P. Allen. This will incorporate data from both archaeological and geological projects concerning the Pleistocene deposits in the eastern part of the Wansunt Pit, and will address their nature, formation process, sequence and date, with particular reference to the Wansunt Loam. This report will incorporate analysis and interpretation of the Palaeolithic artefacts from both archaeological and geological projects carried out as part of the post-excavation programme of the archaeological team. This main report will be published in a national journal concerned with Palaeolithic archaeology and Quaternary science, such as *Proceedings of the Geologists' Association* or the *Quaternary Newsletter*.
- 7.1.3 A second subsidiary report summarising the results from the area investigated archaeologically will be produced by the archaeological team, based at Oxford Archaeology. This will report the stratigraphic sequence at this part of the site, and provide a summary of the later finds from the Holocene deposits, reflecting the record of occupation from post-Palaeolithic archaeological periods. This subsidiary report will be published in a local journal such as the *London Archaeologist*, in summary form.

8. METHODS

- 8.1.1 The post-excavation analysis phase of the project will have six main elements (Table 9). Elements 1 and 4 will be the concern of the geological investigation team directed by P. Allen on behalf of English Nature. The Pleistocene/Palaeolithic reporting (element 4) will incorporate the results of element 2. This method statement concentrates upon methods adopted for elements 2, 3, 5 and 6 carried out under the direction of Oxford Archaeology.

Table 9: post-excavation elements cross-referenced with objectives

<i>Element</i>	<i>Description</i>	<i>Objectives</i>	<i>Carried out by</i>	<i>Funded by</i>
1	Pleistocene geology	1.1–1.4	P. Allen	English Nature
2	Palaeolithic archaeology	2.1–2.3	Oxford Archaeology	English Heritage
3	Holocene archaeology	3.1	Oxford Archaeology	English Heritage
4	Pleistocene/Palaeolithic reporting	4.1	P. Allen	English Nature
5	Holocene reporting	4.2	Oxford Archaeology	English Heritage
6	Archive deposition	5.1	Oxford Archaeology	English Heritage

8.2 Palaeolithic archaeology

- 8.2.1 The assemblage of flakes from Geological Section 1 needs to be examined by the two Palaeolithic archaeological consultants, and the technological strategy associated with their formation interpreted as far as possible from their shape and dorsal scar orientation. Attributes such as size, amount of cortex, abrasion of cortex and dorsal scar count need to be recorded to help in interpretation of reduction stage and raw material source. The stratigraphic positions of the finds needs to be compared with those from the 1995 excavation, to investigate the degree to which finds in sharp condition are present in distinct horizons, or whether they are distributed throughout the Wansunt Loam. A report needs to be written summarising and interpreting these data, and considering any possible implications for site interpretation, raw material source and the modelling of behaviour in the landscape. *Tasks 1, 2 and 3.*
- 8.2.2 A selection of the debitage needs to be illustrated for inclusion in the final Palaeolithic/Pleistocene publication. *Task 4.*

8.3 Holocene archaeology

- 8.3.1 The lithics from the Holocene deposits need to be examined and catalogued to determine whether any of them are diagnostic of particular cultural periods. The pottery is all post-Roman in date and has no further potential. The two conjoining fragments of bone have been identified as probable adult human femur and requires no further work. The results of the lithics analysis need to be written up as a summary report. *Task 6.*

8.4 Holocene reporting

- 8.4.1 The stratigraphic sequence of Holocene deposits from the main archaeological excavation needs to be drawn up and described for inclusion in the excavation summary report. Culturally diagnostic artefacts (such as the leaf-shaped arrowhead and any diagnostic pottery) need to be illustrated. The report needs to be submitted for

publication to *London Archaeologist* with copies to Greater London SMR, the NMR Record Library and other statutory recipients as per the reporting requirements of the tender document (GLAAS 2000). *Tasks 5, 7, 8 and 9.*

8.5 Archive deposition

- 8.5.1 The entire project archive from both archaeological and geological projects needs to be integrated and indexed for deposition at an appropriate receiving institution (probably the British Museum - to be confirmed) and then deposited there. *Tasks 10 and 11.*

9. RESOURCES AND PROGRAMMING

9.1 Project team

Table 10: project team

<i>Personnel</i>	<i>Job description</i>	<i>Key relevant skills</i>
Stuart Foreman	Project Manager	Experienced project manager for many major projects, including Channel Tunnel Rail Link work at Ebbsfleet
F.F. Wenban-Smith	Palaeolithic archaeological consultant	Senior Research Fellow, University of Southampton Director Red Barns Lower Palaeolithic Project Director Swanscombe Community School Project Director work on Dartford Heath Gravels at Bexley Senior supervisor Boxgrove Hominid Project 20 years experience of Palaeolithic excavation, Pleistocene recording and lithic analysis
Mark White	Palaeolithic archaeological consultant	Lecturer on prehistoric archaeology, University of Durham Previous excavation in Wansunt Pit Extensive experience in analysis of Palaeolithic artefacts, including previous study of those from Wansunt Pit
Barbara McNea	Lithic Illustrator	Experienced illustrator of Palaeolithic artefacts, including work on Red Barns material, Swanscombe material, Solent material
OA Illustrator	Oxford Archaeology Illustrator	Experienced graphic layout archaeological reports and illustrations
Angela Boyle	Holocene reporting	Experienced post-excavation manager.
Hugo Lamdin-Wymark	Holocene lithics	Lithics specialist

9.2 Project management

- 9.2.1 The archaeological aspects of the project will be managed and co-ordinated by Oxford Archaeology. The Pleistocene geological aspects will be managed and co-ordinated by P. Allen on behalf of English Nature.

9.3 Task list

9.3.1 The task list for each of the archaeological project elements is summarised in Table 11 below.

Table 11: task list

<i>Element</i>	<i>Objectives</i>	<i>Task</i>	<i>Task description</i>	<i>Personnel</i>	<i>Days</i>
2 Palaeolithic archaeology	2.1, 2.2, 2.3	1	Analysis and description of Palaeolithic artefacts	FFWS, MW	2
		2	Comparison of stratigraphic positions of Palaeolithic assemblage with 1995 dig	FFWS, MW	1
		3	Written report on Palaeolithic archaeology	FFWS, MW	2
		4	Illustration selected/representative artefacts	BMcN	3
3 Holocene archaeology	3.1	5	Stratigraphic description/interpretation	AB	1
		6	Lithic artefact examination and report	HLW	3
		7	Report writing	AB	1
		8	Edit/submit report to <i>London Archaeologist</i>	AB	0.5
		9	Copy report to relevant bodies	AB	0.5
5 Archive deposition	4.1	10	Collate/index site archive	NS	3
		11	Deposit site archive at receiving institution	NS	1

9.4 Equipment

9.4.1 All necessary equipment for the proposed post-excavation analysis and reporting tasks is on-site at the institutions where these tasks will be carried out: Oxford Archaeology and University of Southampton, Department of Archaeology. No specialist equipment is required.

9.5 Facilities and institutional support

9.5.1 All the tasks will take place at either Oxford Archaeology or the Department of Archaeology, University of Southampton. These institutions will provide whatever facilities and administrative support is required.

9.6 Budget

Table 12: financial information

YEAR 2002-03					
<i>OA Staff</i>		Per day	Days	Cost	Total
Project Manager	SF	169.00	1	169.00	
Project Manager	AMB	169.00	3	507.00	
Lithics Specialist	HLW	115.00	1	115.00	
Archives Officer	NS	115.00	2	230.00	
Total salary costs for year					1021.00
<i>Specialist fees</i>					
Palaeolithic consultant	FFWS	150.00	5	750.00	
Palaeolithic consultant	MW	150.00	5	750.00	
Palaeolithic illustrator	BMcN	125.00	3	375.00	
Total specialist fees for year					1875.00
<i>Non-staff costs</i>					
Project expenses				150.00	
Archive Deposition				150.00	
Total non-staff costs					300.00
<i>Overheads</i>					
OA overheads@25%				414.75	
Overhead on specialist fees@10%				187.50	
Total overheads					330.25
Gross total for year 2002-03					3526.25

9.7 Timetable

9.7.1 The overall duration of the post-excavation analysis is three months from the point at which the proposed programme is approved. All work and archive deposition should therefore be completed well before the end of 2002.

9.8 Health and safety

9.8.1 All work will be carried out under the existing Health and Safety regimes at the relevant institutions, which require a Risk Assessment to be prepared for any piece of work, and all work to be carried out with due consideration for normal safe working procedures.

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Scale 1:25,000

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Figure 1: Site location.

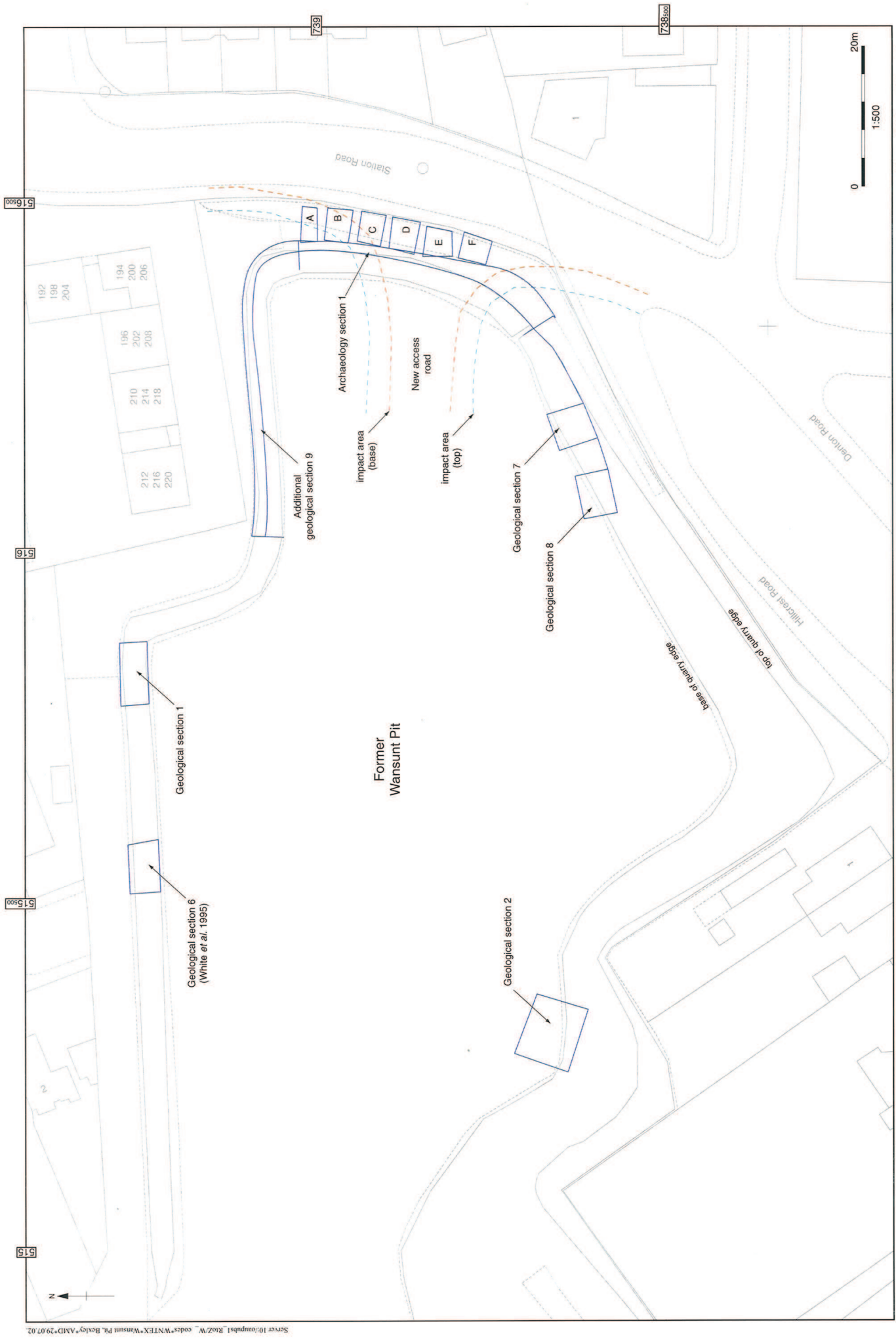


Figure 2: Trench locations.



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