

# Thames trail: Quaternary and Palaeolithic records from the Thames terraces



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The Thames Gateway, also known as the Lower Thames east of London, has an extraordinary wealth of geosites representing the Middle and Upper Pleistocene, many with rich fossil faunas and Palaeolithic archives. Several had been Sites of Special Scientific Interest from the early days of statutory geoconservation.

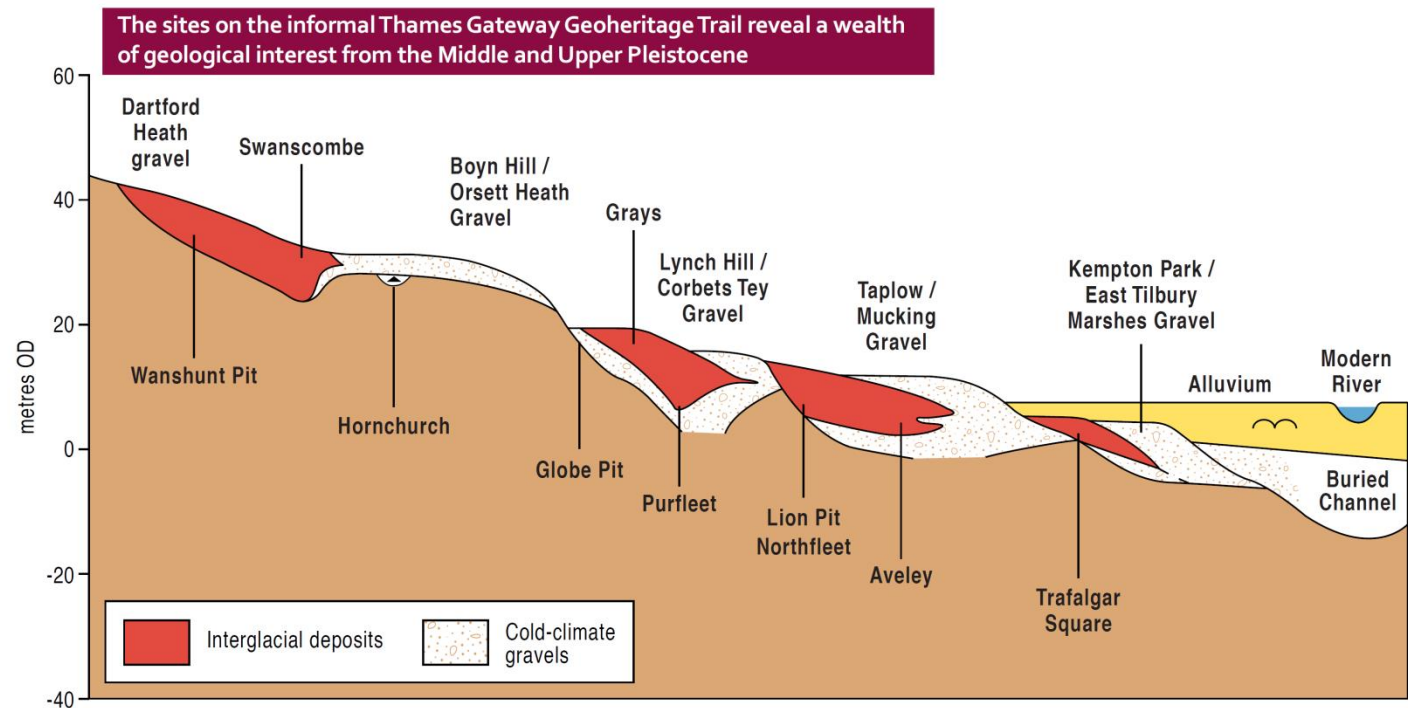
Not all the important sites have been saved for posterity; brickearth quarries at Crayford, Ilford and Grays provided some of the most important collections of fauna and artefacts but no conservation site exists at any of these (although there is an unfossiliferous trace of the Grays Brickearth at the Globe Pit SSSI: *see below*). Similarly the Last Interglacial cycle, in the lowest terrace (*see the diagram below*), is represented only in the upstream area, beneath central London, where the Trafalgar Square deposits are justifiably famous, although geoconservation measures are impossible. Nonetheless, these localities deserve inclusion in a longer list of sites to visit on a 'Thames Gateway Geoheritage Trail'.

The trail documented here can be modified to produce **short** ●, **medium** ● and **long** ● versions, with explanations of what might be observed and how to visit those on private land. It can also be extended into Essex and East Anglia, where the Thames story can be further unravelled and the earlier history of the river discerned (*see Earth Heritage 38, p. 30 – Geology Thrives in Essex*)

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Photo credits needed throughout this article



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## Gazetteer of sites

### ● Hornchurch railway cutting

**TQ 547874** The park abutting the railway can be visited casually. Entry into the railway cutting requires special permission from National Rail

In many ways this site is the starting point for the geological history of the Lower Thames, since it shows Boyn Hill (Orsett Heath) Terrace gravel above Anglian Lowestoft Till, the latter recording the glaciation (450,000 years ago) that diverted the Thames into its modern valley through London. Visits require permission and guidance from Network Rail and cannot be undertaken casually.

### ● Wansunt Pit, Dartford Heath

**TQ515738** Trains from London (Charing Cross & London Bridge) to Dartford

For decades there has been a controversy amongst geologists and archaeologists about whether what is mapped as the Boyn Hill Terrace at Dartford Heath is the same terrace as at the more famous Swanscombe locality, despite the former being nearly 10 metres higher. The case is not quite settled but archaeological assessment work prior to the development of the Swan Valley Community School revealed a thicker sequence at Swanscombe, bridging the height gap between the sites. It is also possible that the Swanscombe Upper Loam correlates with the Wansunt Loam. Both have yielded distinctive ovate hand axes with twisted edges, a type thought to be characteristic of the interglacial represented at Swanscombe. When the worked-out floor of Wansunt Pit was developed for housing the SSSI sections were largely unaffected and some are probably more accessible as a result. However, they need vegetation clearance and re-excavation to make a visit worthwhile.



Above, excavation work at the Hornchurch railway cutting site

Left, a handaxe found in Thames floodloam deposits overlying the Dartford Heath Gravel at Wansunt Pit in 2005

Below, Swanscombe's striking stainless steel statue pays tribute to the finds at the site

### ● Swanscombe Skull Site and Heritage Park

**TQ 597743** Trains from London (Charing Cross & London Bridge)

One of the first, and still one of just a handful of geological National Nature Reserves (NNR), the Swanscombe Skull Site has yielded prolific Pleistocene fossils as well as Palaeolithic tools and the waste from flint tool making. A London dentist and amateur collector discovered the first two pieces of the single skull in the 1930s, with the third piece added from an archaeological excavation 20 years later. A later archaeological excavation revealed animal footprint impressions at the top of the Lower Loam. From time to time sections are opened up here for excursions or research sampling but otherwise there is little geology on view, as the sections are deliberately covered to deter casual collecting. It is still worth a visit to see the giant stainless steel hand axe statue and the other interpretation boards, and there is also a small display, including a replica skull and some bones, in the Swanscombe Centre, near the entrance to the NNR. The Rising Sun public house, watering hole for generations of collectors and diggers, no longer has interpretive material on display but retains its traditional atmosphere.



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## ● Globe Pit, Little Thurrock

TQ 625783 Trains from London (Fenchurch Street) to Grays

Despite a history of ill-informed damage and inadequate conservation this SSSI remains important as a reserve of undug gravel rich in Palaeolithic artefacts. These are claimed to represent the Clactonian industry, which lacks hand axes and is known from a relatively small number of sites, including the type locality at Clacton-on-Sea and the Swanscombe Skull site, where Clactonian archaeology is represented within the lowest strata, below the layers with hand axes and below the skull discovery. While Swanscombe and Clacton are thought to be lateral equivalents, the Globe Pit deposits represent a lower and later terrace.

The unfossiliferous feather-edge of the interglacial deposits, which were once visible in more extensive and fossil-bearing sections (before being illegally cut back by the former site owners), represent the 'Grays Brickearth', which was exploited in large hand-dug 19<sup>th</sup> Century quarries and yielded a plethora of Pleistocene fauna. These were the Grays brickpits:

## ● Grays Brickpits

TQ 623781 The pits are still recognizable as lowered areas, now used as parks and allotments, with no exposures available

A more recent indignity was caused when the gardens of houses built on the old quarry floor at Globe Pit were allowed to extend to within a metre of the geological section. The most important part of the SSSI, the foot of a small undug reserve of Palaeolithic gravel, can be reached via a dedicated gate and narrow path (provided by the developer) which gets heavily overgrown. The future accumulation of talus is likely to be a problem and will mean that re-excavation or site cleaning will be confined to manual efforts. A future improvement will be to provide an access ramp or steps to the top of the undug reserve, which could be designed to provide new exposures.

## ● Purfleet Chalk Pits

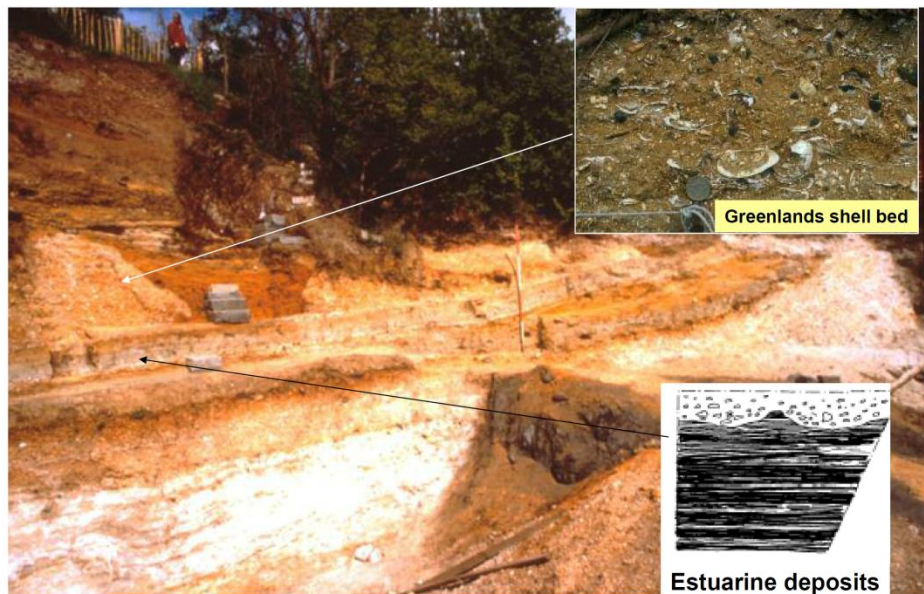
TQ 567785 Trains from London (Fenchurch Street)

One of the most important of the newer Thames SSSIs, this complex of quarries, conserved for their Pleistocene interests, reveals evidence of a relatively little known interglacial (at about 350,000 years ago), later than that at Swanscombe and also warmer, although with a much shorter climatic optimum interval. This is the same interglacial as in the historical brickearth quarries at Grays and Little Thurrock, which represent lateral equivalents of the interglacial sediments at Purfleet and were a few kilometres further downstream. Purfleet is situated half-way round a reversed S-shaped bend in the old Thames, the deposits having been laid down by currents flowing WSW. A conservation section is maintained on the northern side of Greenlands Quarry and can be visited by arrangement, with a key to the gate available locally (visitors should contact Natural England for details).

The sections are highly revealing, with alternations of gravels, shelly sands and laminated silts of estuarine facies; they can, however, become somewhat degraded between visits.

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*Despite a history of ill-informed damage and inadequate conservation this SSSI remains important as a reserve of undug gravel rich in Palaeolithic artefacts*



The section at Greenlands Quarry, part of the Purfleet Chalk Pits SSSI. The insets show close-ups of the fossiliferous interglacial shell bed and a drawing of the estuarine silts, in which tidal cycles can be determined from lamination patterns

Purfleet, from previous page

The site is also important for its three superposed archaeological 'industries'

- Clactonian at the base (probably a lateral equivalent of that at Globe Pit);
- a hand-axe industry in the middle part of the sequence; and
- a later Levallois industry, characterized by more sophisticated preparation of flint 'cores' (from which 'flakes' are struck). The upper deposits at Purfleet are the oldest in the Thames to have yielded this type of archaeology.

In the early years of the new Millennium the high-speed rail-link from London to the Channel Tunnel required a new cutting through parts of the Purfleet SSSI and extensive archaeological and geological investigations took place in mitigation. Details were recently published in the Proceedings of the Geologists' Association.

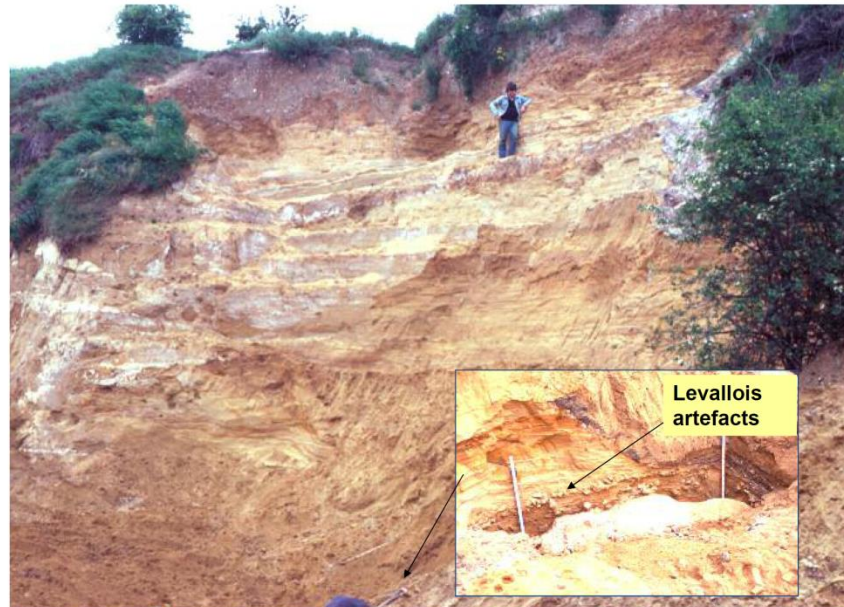
Thames sediments banked against a chalk cliff at Lion Pit, West Thurrock. Inset shows archaeological layer

## ● Lion Pit tramway cutting

TQ 597782

Trains from London (Fenchurch Street) to Grays

This is another statutory geoconservation site that dates back to the early years of the Nature Conservancy; Natural England's files include notes made by the original NC geologist, W.A. Macfadyen, who documented information from the (geo)archaeologist S.H. Warren, including the location of basal gravel containing important Palaeolithic artefacts. This Levallois archaeology includes flint-working debris where the tools were made, on the former river bed. These records allowed GCR workers to re-locate this gravel and confirm its importance. A GCR dig here also confirmed a different fossiliferous interglacial 'brickearth', dating from the penultimate interglacial (= MIS 7 of the oceanic record). The site has now been incorporated into the fringes of the Chafford Hundred development and a new footpath has been created along the floor of the cutting, making access easier, although the sections have become badly degraded since the GCR excavations in the 1980s.



## ● Aveley, A13 cutting and adjacent gravel quarry

TQ 555798

The cutting sides SE from the Purfleet Road overbridge pass through the fossiliferous sediments. They can be observed from the bridge but pedestrian access to the road cutting is not advisable

The former Sandy Lane Quarry at Aveley was selected as a GCR site on the strength of its abundant palaeontology, in particular multiple elephant skeletons. That quarry was impossible to conserve and was subsequently infilled, but the richness of the mammalian fauna in these sediments was again revealed when they were exposed in a cutting for the new A13 dual-carriageway road, in the late 1990s. An alternative SSSI was thus identified at a locality that provides potentially the most complete record of the MIS 7 interglacial complex in Britain and, arguably, the best anywhere.

There is little to be seen on a casual visit and the possibility for temporary exposure in the road cutting has yet to be tested. It would be valuable for a section to be opened in the quarry, albeit it that it probably exposes only gravel, perhaps a solifluction deposit on the bluff between the two terraces.

Excavating the A13 cutting at Aveley



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## ● Northfleet, Baker's Hole complex

TQ 612740 Trains from London (Charing Cross & London Bridge)

Located in the south-bank tributary Ebbsfleet valley, Baker's Hole SSSI coincides in part with a Scheduled Monument ('Palaeolithic sites near Baker's Hole') due to its many Levallois artefacts. This and adjacent fossiliferous localities have been heavily compromised by quarrying, landfill, vegetation and the Channel Tunnel rail link. As at Purfleet, the developer funded a site investigation to help mitigate the damage to geodiversity. The site requires some re-excitation and/or section cleaning to make it worth a visit.

## ● Trafalgar Square

TQ 300804 Can be visited upon return to London

In the main Thames downstream of Oxfordshire, the Last Interglacial is represented only in Greater London, where the prospects for permanent exposure are zero. Nonetheless, the terrace geomorphology can be determined from the lie of the land, despite the urban development. Records of Ipswichian faunal remains from building sites in the southern part of Trafalgar Square can be traced in the built environment, giving some insight into the alignment of a Last Interglacial channel fill. BGS mapping and knowledge of changes in the ownership and use of buildings will help further. Visiting this locality is likely to be of greater value than sojourns to lateral equivalents at Brentford or Peckham; at least at Trafalgar Square there are stone lions as a poignant link to the fossils of the animal found nearby.

The Trafalgar Square lions are a poignant link to the fossils of the animal found nearby.

*Photo by Pilgab/Wikimedia Commons*



**THAMES QUATERNARY TRAILS.** The **short** trail takes in all four terraces, selecting the best sites. The **medium** trail adds sites in approximate order of quality of interest. The **long** trail includes sites from further afield (see Bridgland, 1994, GCR volume 7).

SHORT TRAIL	MEDIUM TRAIL	LONG TRAIL		
Swanscombe	Baker's Hole (Northfleet)	Stoke Newington & Hackney	TQ 339867	Same terrace as Purfleet & Grays. Urban sites, no exposures
Purfleet	Wansunt Pit		TQ 345859	
Lion Pit	Globe Pit	Cudmore Grove, East Mersea	TM 068146	NE Essex; River Colne deposits. Cliff and foreshore exposures
Trafalgar Square	Hornchurch			
	Grays Brick Pit			
	Aveley A13 cutting	Clacton-on-Sea	TM 173141	Palaeolithic type locality; interglacial deposits (MIS 11 – Swanscombe age)