

North Kent Woods and Downs National Nature Reserve

Heritage Characterisation Statement

Theme 1: Landscape and Environment

Introduction

This theme summarises the recent geoarchaeological evidence for how the landscape of the NNR has changed over the last half a million years and the evidence for early human activity up to the early Holocene, c.12,000 years ago.

The Palaeolithic is the earliest period of human history and has an immensely long duration, which in Britain covers the earliest hominin occupation some 800,000 years ago to the end of the last ice age, c.10,000 years ago (Wenban-Smith, 2007). The British Palaeolithic coincides with the second half of the Pleistocene, a period of glacials and interglacials often referred to as 'The Ice Ages'. The NNR is located to the south of the maximum extent of former glaciers, during which periods Britain was uninhabitable. During the warmest periods of the interglacials the climate would have been warmer than today with mollusc species that now inhabit the Nile abundant in British rivers and tropical fauna including hippopotamus and forest elephant, common in the landscape. The present landscape of Britain is in large part the result of almost two million years of these processes of erosion and deposition. The best evidence for the Palaeolithic, therefore, tends to be buried under five, ten or even twenty metres of ancient river gravels, cliff collapse or mass slope-movement deposits. Geoarchaeological studies are required to understand these contexts.

Understanding the geoarchaeology helps us understand the context in which archaeological remains may be found and thus how people in the past lived in and used the area. It also helps us appreciate the complexity of the area and what 'underpins' the present-day character.

At its simplest the bedrock geology of the NNR area, which is entirely comprised of sedimentary geologies, can be divided into two parts with the dividing line approximately following the line of the Southern Railway. The northern half is characterised by Late Cretaceous Lewes Nodular Chalk, overlain by more recent sand, silts and clays of the Thanet Formation, Harwich and Lenham Formations and London Clay. The northern half is characterised by higher ground with watersheds to the west, north, east and south.

The southern half is also characterised by Cretaceous Chalks (Lewes Nodular Chalk, Seaford and Newhaven Formation etc..) but is incised by a series of dry valleys that run, initially northward and then east into the Medway valley. Overlying the older 'bedrock' geology are superficial Head deposits, Pleistocene solifluction and colluvial 'hill wash' deposits in the dry valleys of the chalk downland. The younger hill wash deposits are a result in large part, from agricultural cultivation, starting approximately five to six thousand years ago during the Neolithic and Bronze Age periods.

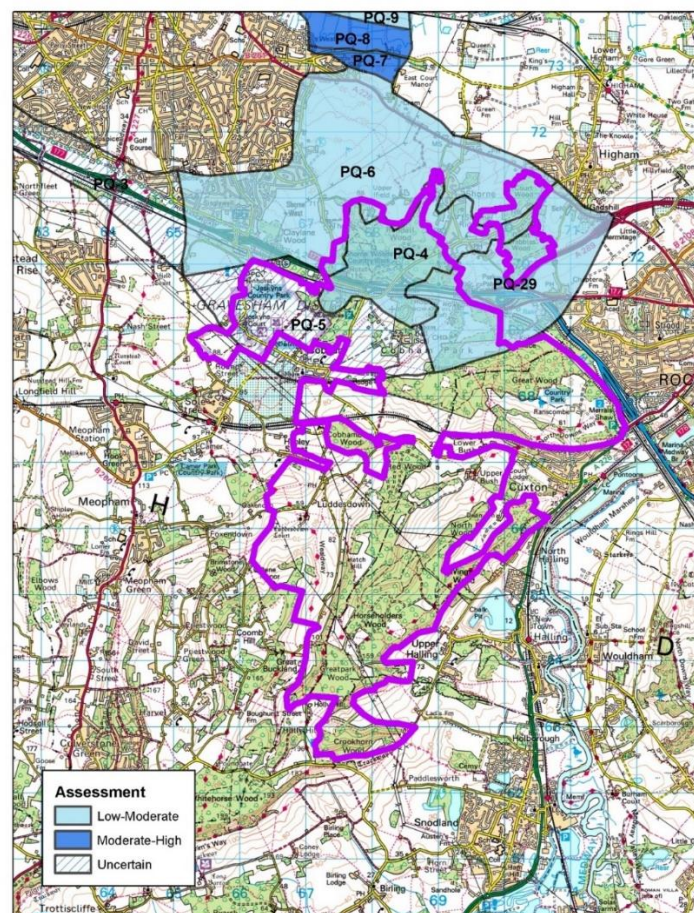
Recent geoarchaeological field evaluation for the Lower Thames Crossing (Oxford Cotswold Archaeology and Wenban Smith and Bates – see for example Lower

Thames Crossing - Palaeolithic and Quaternary Deposit Model (PQDM) and Desk-based Assessment of Palaeolithic Potential) has demonstrated the complexity of the palaeo-topography and range of superficial deposits across the northern part of the project area. This research demonstrates that the NNR lies within an area of low to moderate Palaeolithic archaeological and Quaternary geological importance, spanning the last half a million years (c.500,000 to c.12,000 years ago) as well as for the subsequent Holocene (12,000 years ago to present day).

Defining Palaeolithic character areas

The most recent research into the Palaeolithic and early Holocene geoarchaeological and archaeological interest of the area has been undertaken by Drs Francis Wenban-Smith and Martin Bates for Highways England's Lower Thames Crossing project. Their study area included part of the northern half of the NNR area and provides a useful context for understanding the early prehistoric archaeological interest. Along the full LTC project area from Essex to Kent, 33 distinct zones (PQ zones) of varying Palaeolithic/Quaternary deposit character and importance were defined, of which zones PQ1-9 and PQ29 are in Kent or span the River Thames area. Each zone has been attributed a category of low, medium or high Palaeolithic and geo-archaeological potential (PQDM Section 8; Table 8).

**Kent Historic Environment Record -
Palaeolithic and Quaternary zones**



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0 625 1,250 2,500 Metres



The authors note that relatively little detailed work has yet been undertaken on Pleistocene or Holocene deposits in the area and, as-yet-undiscovered sites of similar high importance to those already known are likely to be present in the areas identified as of high importance in the LTC report. These may include land within the NNR area.

Below is a summary of the zones in Kent (see figure above) which are relevant to the NNR area, with a brief description of their character and potential with related recommendations for further investigations. This research is repeated here to illustrate the complex nature of the resource and the type of work that would be needed to take forward further investigations within the NNR. Realistically, it is likely that this fieldwork would be undertaken only if the LTC scheme goes ahead.

However, initially, it would be helpful to commission the same level of desk-based assessment (from the same authors) for the full NNR area to extend the characterisation through to the Medway and south beyond the Pilgrim's Way.

The text is taken from LTC document Lower Thames Crossing - Palaeolithic and Quaternary Deposit Model (PQDM) and Desk-based Assessment of Palaeolithic Potential.

PQ-3. Ebbsfleet Valley (upland catchment). This zone is a linear zone parallel with the A2 and represents the upland catchment of both tributaries of the Ebbsfleet river. Ground surface elevation is between 25m and >65m O.D. and Chalk and Thanet Formation form the bedrock throughout the zone. BGS mapping suggests the valley sides and plateau surfaces are devoid of sediments although thin discontinuous spreads of superficial sediments, less than 1m thick, may exist in some places. The valley base is likely to contain Head/Colluvial deposits that are likely to be a mixture of poorly sorted flint rich gravels derived from solifluction processes in the last cold stage (however, pre-Devensian or early Devensian deposits should not be ruled out – see Wenban-Smith and Bates, 2011) and colluvium consisting of finer grained sediments resulting from Middle to Late Holocene soil erosion. The potential exists for the presence of buried soils in the sequences that may be of late glacial or Holocene age. Chalk bedrock suggests that preservation of molluscs and vertebrate material is possible. No works are recommended for Stage 1 however in Stage 2 a number of key questions are identified such as how complex are the sequences in the valley base, is there evidence for pre last glacial maximum sequences (including pre-Devensian), is there evidence for Late Upper Palaeolithic occupation associated dry valley/colluvium?

PQ-3 defines an area of c.24ha of the Ebbsfleet Valley upland catchment with Chalk and Thanet Sand bedrock and Head infilling dry valleys and as intermittent spreads/patches on the valley sides and less sloping areas with an Uncertain potential. The PQDM notes *'three Palaeolithic findspots within this area (LTC 1661, 2368, 3197), the former probably representing an undisturbed palaeo-land surface under older pre-Devensian colluvium on which was found a handaxe and knapping debitage. Other nearby remains from outside the area, but from deposit-types likely to be present in the area, include minimally disturbed Late Upper Palaeolithic knapping scatters (LTC 2370, 4045) from fine-grained colluvial sediments infilling dry*

valleys, as well as various more-derived lithic finds (LTC 3197, 3370)'. LTC 1661 is described in the DCO documentation as 'a rare type of site, associated with an unmapped spread of Pleistocene colluvium. LTC 4045 is likewise a rare site-type, although associated with mapped dry valley deposits'.

The recommendation in the DCO documentation is for *'preliminary evaluation test pitting to (a) evaluate whether other Lower/Middle Palaeolithic sites are present in this zone in similar topographic locations to LTC 1661, and (b) to evaluate for pre-Last-Glacial Maximum sequences (including pre-Devensian), and for Late Upper Palaeolithic occupation associated with dry valley colluvial infill'*.

The SPAA-&-RF, Annex F (APP-359) recommends stage 1 fieldwork to comprise test pits located carefully in relation to geological mapping and GI data and following review of ATT data but Annex I of the PQDM (APP-358) does not recommend the need for Stage 1 investigations. The zone covers land adjacent to the A2.

PQ-4. Shorne Woods Plateau. This zone forms an interfluvium between the Thames and Medway catchment at the present day. Ground surface elevations vary from 75m to at least 120m O.D. Small dry valleys exist and have their origin in the plateau area. Lambeth Group, Harwich Formation and London Clay Formation form the bedrock throughout the zone. Narrow strips of Head deposits are mapped by the BGS and are likely to consist of gravels and clay/silt/sands, some possible colluvium may also be present filling the heads of the dry valleys. Thin discontinuous spreads of superficial sediments (?Head), less than 1m thick, may exist across parts of the area. Preservation potential for the sediments is unknown. Sediments may range in age from ?Late Devensian to Holocene, although the possibility exists that older sediments may exist in pockets through the area. Any artefacts and faunal remains are likely to be reworked although potential patches of older sediments may contain less disturbed material. No works are recommended for Stage 1, in Stage 2 the possibility that residual material of Lower/Middle Palaeolithic material on the high ground should be investigated.

PQ-4 defines an area of c.42ha of the Shorne Woods Plateau, a high-ground interfluvium between Thames and Medway, formed of an outcrop of Lambeth and Thames Group bedrock with Low/Moderate potential.

The PQDM (APP-158) notes that *'no Palaeolithic finds are reliably known from within zone, but notes finds of a handaxe and Levallois flakes from the general Shorne area (LTC 3374) and two handaxes from the analogous high point of Windmill Hill, Gravesend (LTC 4051). Sediments from solifluction and colluviation are present and ranging from ?Late Devensian to Holocene in date with any artefacts and faunal remains likely to be reworked'*.

The SPAA-&-RF, Annex F (APP-359) recommends stage 1 fieldwork to comprise transects of test pits.

PQ-5. Jeskyns high ground shelf. This zone consists of the high ground and plateau edge west of PQ-4. Ground surface elevations are between 85m and 100m O.D. and the zone lies at the head of dry valleys trending into both the Thames and Medway systems. Chalk and Thanet Formation forming the bedrock that indicate

that at least in places preservation of carbonate based palaeoenvironmental material be possible. Head deposits are mapped by the BGS and probably consist of gravels with sand/silt/clay distributed in widespread valley features. Any artefacts and faunal remains present likely to be reworked. Stage 1 investigation need to focus on the basic characterisation of sequences. Stage 2 investigations should focus on any evidence for pre-Devensian deposits in the area. An additional question can be addressed at examining whether the sequences and preservational potential of large spreads of Head deposits in this zone differs from the narrower strips of head in restricted valley bottom areas in zones PQ-3/4.

PQ-5 defines an area of c.72ha of the Jeskyns shelf, a broadly-level area of high-ground between Thames and Medway catchments and slightly lower than PQ-4. It is characterised by Thanet Sand with wide spreads of Head and possibly small outcrops of high “plateau gravels” with an uncertain potential.

The PQDM (APP-158) notes ‘*Several records of surface finds of Lower/Middle Palaeolithic artefacts from general area (LTC 4035, 4039, 4050), as well as nearby discovery of handaxe and debitage from palaeo-landsurface under unmapped colluvium (LTC 1661)*’ and recommends ‘*Basic characterisation of sequences - is there evidence for pre-Devensian colluvial deposits in the area, do they contain Palaeolithic remains of any type, and are there any artefacts less-disturbed than in dry valley fill deposits*’.

The SPAA-&-RF, Annex F (APP-359) recommends stage 1 fieldwork to comprise test pits located in transects across areas mapped as Head - test pits positioned in more-level areas and/or areas where depressions in bedrock might have become infilled.

PQ-6. Thong Lane. This zone is part of the dip-slope of North Downs and contains a network of dry valleys generally dipping north towards the Thames, with ground surface elevations between 35m and 80m O.D. Chalk is the dominant bedrock, with Thanet Formation and localised outcrops of Lambeth Group and Harwich Formation also present. The valley sides and plateau surfaces are mostly devoid of Quaternary sediments although thin discontinuous spreads of superficial sediments, less than 1m thick, may exist. The bases of the valleys contain Head/Colluvial deposits likely to consist of coarse, poorly-sorted flint gravels as well as finer grained clay-silts in which the potential exists for the presence of buried soils in the sequences. Cold climate solifluction processes are likely to have resulted in the deposition of the majority of the Head, probably in late Pleistocene (<20ka B.P.) but earlier phases of slope wash and solifluction may be locally present. Colluviation in late Holocene following deforestation of the Chalk during the Neolithic/Bronze Ages may have taken place. Carbonate-based palaeoenvironmental material may survive in these deposits and any artefacts and fauna remains likely to be reworked although colluvium may contain elements of *in situ* material.

Trial-trenching in this zone (for instance in LP 81, investigated as part of WSI V in 2020 - Report HER-00031 by Oxford Archaeology, v1.2 February 2021; and in LP 75, investigated as part of WSI T in 2020 - Report HER-00029 by Oxford Archaeology, v2.1 December 2021) has confirmed the presence of at least three depositional

phases typically infilling the bases of dry valleys, with a coarse basal gravel (probably of Late Glacial date) often being overlain by fine-grained colluvial brickearth infill (probably from the Last Glacial Maximum and the period up to the start of the Holocene), capped by gravelly Holocene ploughwash. And there are also areas of brickearth higher up the valley flanks and on plateaus/interfluvies between the dry valley network that may be of Last Glacial date. There is potential for Late Upper Palaeolithic archaeology to be present at the base of the ploughwash where it overlies fine-grained colluvial brickearth, and in areas of brickearth on interfluvies and plateaus. Flint artefacts that may date to the Lower/Middle Palaeolithic were found in the base of the dry valley network in LP 75, in trenches 507 and 515. These are thought to have been reworked from older/higher deposits upslope to the south and southwest.

Stage 1 investigation should be targeted at (a) investigating the deposits at trenches 507 and 515, dating them, recovering a greater sample of artefacts, and understanding how the full sequence formed; and (b) at establishing the distribution of the higher-potential deposits for Late Upper Palaeolithic evidence. Stage 2 should then be focused on further more-detailed work to investigate for evidence of Late Upper Palaeolithic activity, and recover it if/when found.

PQ-6 defines c.420ha of the Thong Lane dip slope of North Downs characterised by Chalk and Thanet Sand bedrock with Head in dry valleys and intermittently across bedrock sides and plateau surface with Low/Moderate potential.

The PQDM (APP-158) notes '*One reworked Palaeolithic findspot within this area (LTC 3123). Some important nearby finds from deposit-types likely to occur in this zone, notably a handaxe and knapping debitage from unmapped colluvium (LTC 1661), and minimally disturbed Late Upper Palaeolithic knapping scatters (LTC 2370, 4045) from fine-grained colluvial sediments infilling dry valleys, as well as several nearby finds of most-likely residual/re-worked material (LTC 3197, 4035, 4039, 4055)*' and questions whether there is 'evidence for pre-Devensian colluvial deposits in the area, do they contain Palaeolithic remains of any type, and is there evidence for Late Upper Palaeolithic occupation associated with dry valley colluvium?'.

The SPAA-&-RF, Annex F (APP-359) recommends stage 1 fieldwork to comprise test pits in relation to topography and geological mapping, near areas where the Bullhead flint bed is likely to have been exposed, and in areas identified as more promising by the archaeological trial trenching.

PQ-7, PQ-8 and PQ-9, South Thameside area (PQ-7, Filborough; PQ-8, South Thames floodplain edge; PQ-9, Thames Floodplain (Main)). Local geomorphology and mapped geology. This discrete zone on the south bank of the River Thames consists of the Thames floodplain from the rivers edge southwards to the floodplain edge marked approximately by the 4m contour (Figure I-1). South of the floodplain edge (that is marked by a coherent physical step of approximately 1m elevation – Figure I-2) the ground rises to the south. A series of small, very shallow valley-forms run approximately south to north down the slope (Figure I-3). LTC Archaeology, PQDM v3, October 2022 Appendix I: PQ zones, details and interpretation British

Geological Survey mapping (Figure I-4) shows that Chalk underlies much of the study area (Figure I-4A) while small outcrops of Thanet Sand are also present as patches at the foot of the lower slopes. Superficial geology (Figure I-4B) consists of sediments correlated with the Mucking Gravel occurring as elongated patches distributed parallel with the edge of the alluvium immediately above the floodplain surface (Figure I-2) with an outcrop of Corbets Tey Gravel a little further to the south. Head deposits are seen to occupy the base of the small valley like features. Undifferentiated alluvium occupies the remainder of this study zone.

PQ-7 defines an area of c.7ha of the so-called Filborough-Thames terraces (Lynch Hill and Taplow) lying on Chalk bedrock at the foot of dip slope above the south bank of Thames with Moderate/High potential.

The PQDM (APP-158) notes Moderate palaeoenvironmental potential and '*Several Lower/Middle Palaeolithic artefacts known from nearby area (LTC 4052, 4054), and some specifically from gravel deposits that are likely equivalent to the mapped terrace deposits of this zone (LTC 4053)*' and recommends '*Test pits/boreholes to investigate whether the different mapped terraces are really there? What is the nature of the sedimentary sequences in the different terraces? Are there artefacts, faunal remains and/or materials for dating present?*'.

The SPAA-&-RF, Annex F (APP-359) recommends stage 1 fieldwork to comprise test pits/boreholes to investigate whether the different mapped terraces are there, the nature of the sedimentary sequences in the different terraces and the present of artefacts, faunal remains and/or materials for dating.

PQ-8 defines an area of c.9ha of the Thames southern floodplain edge, comprising Holocene alluvium overlying potential Pleistocene terrace deposits with Moderate/High potential.

The PQDM (APP-158) notes moderate/high palaeoenvironmental potential and '*Late Upper Palaeolithic remains known from base of alluvium at several sites along southern side of Thames floodplain (e.g. LTC 3406). Also, nearby records of Mousterian bout coupé handaxes from Tilbury (LTC 4028) suggest there may be unrecognised deposits/remains of this era in places*'. Recommendations are made for Stage 1 mitigation comprising '*Boreholes and test pits to address what are the nature and age of the sub-alluvial Pleistocene sediments in the zone, and do they have any Palaeolithic remains? What is the nature of the surface of the Pleistocene sediments, and what, if any archaeology rests on this surface? When did Holocene sedimentation begin and are there Holocene archaeological remains in the alluvium?*'.

The SPAA-&-RF, Annex F (APP-359) recommends stage 1 fieldwork to comprise boreholes (and test pits, if ground conditions permit), guided by GI results and closely spaced in broadly north-south transects transverse to presumed eastward fluvial flow.

PQ-9 defines an area of c.300ha of the Thames floodplain characterised by Holocene alluvium overlying Late Pleistocene gravel (Shepperton) with Low/Moderate potential.

The PQDM (APP-158) notes *'Late Upper Palaeolithic remains known from base of alluvium at several sites along southern side of Thames floodplain (eg. LTC 3406). Also, nearby records of Mousterian bout coupé handaxes from Tilbury (LTC 4028) suggest there may be unrecognised deposits/remains of this era in places, although most Palaeolithic remains are most-likely derived and transported (LTC 4036)'*. The DCO PQDM recommends that Stage 1 mitigation should evaluate whether the sands seen on the northern side of the zone are Holocene or Pleistocene (i.e. the equivalent of those in PQ-8) and address the research question of when sedimentation began across the surface of the Shepperton Gravels.

The SPAA-&-RF, Annex F (APP-359) recommends stage 1 fieldwork to comprise boreholes, guided to complement (or supplement) GI results, and positioned in broadly north-south transects transverse to presumed eastward fluvial flow.

PQ-29 defines c.76ha defined as the Park Pale - South Downs (Medway basin) area of chalk downs with Palaeocene outcrops (Thanet Sand, Lambeth Group) dissected by Head-filled dry valleys. The area contains late Pleistocene Head deposits. It is noted that whilst no finds are recorded from this area, Lower/Middle Palaeolithic remains have been found in areas with similar deposits (1661 in PQ-3; and 4039) and Zone PQ-29 is defined (AS-044) as being of medium value. The zone will need to be subject to stage 1 investigation.

Designated and non-designated heritage assets

The NNR lies within an area of very high, multi-period cultural heritage and archaeological interest which survive from the ice ages (Palaeolithic) through to the recent past, representing a unique, finite and non-renewable record of the history of the area. Within the NNR, there are no presently designated Palaeolithic sites, but the Palaeolithic scheduled site at Cuxton [DKE19328] lies c.500m to the east of the NNR and is an example of the high potential of the area.

Recommendations and proposals for projects

Continue the Palaeolithic and Quaternary characterisation across the NNR to link through from the LTC work quoted above to the Medway (e.g. SAM at Cuxton).

Action: **Approach Francis Wenban-Smith to discuss and provide a quote for this work.**

Resources & References:

Wenban-Smith, F., in William, J. H. (Ed.) 2007 The Archaeology of Kent to AD800 Kent County Council. The Boydell Press

Most recent references for assessment are set out in the LTC Environmental Statement (AS-044) and the supporting documents 6.3 ES Appendix 6.5 - **Lower Thames Crossing - Palaeolithic and Quaternary Deposit Model (PQDM) and Desk-based Assessment of Palaeolithic Potential** (APP-358) and 6.3 ES Appendix 6.6 - Lower Thames Crossing - Standalone Palaeolithic Archaeological Assessment and Research Framework (SPAA-&-RF) (APP-359). See for most up-to-date full bibliography.