Newhaven Flood Alleviation Scheme East Sussex

Archaeological Evaluation Report

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Summary

Oxford Archaeology (OA) was commissioned by JacksonHyder on behalf of the Environment Agency to undertake an eight trench evaluation and borehole survey at the site of a proposed Flood Alleviation Scheme in Newhaven, East Sussex (NGR TQ 4470 0110). The work aimed to assess the impacts of the proposed scheme, which comprised a variety of newly constructed flood embankments or improvements to the existing defences along the river Ouse. A programme of five trenches and a borehole survey were undertaken across the main impact areas of the scheme in October 2015.

The work followed on from a desk-based deposit model developed for the site that identified a sequence of alluvial and organic deposits on the western bank of the river at depths between 4m and 5m. The upper surface of mid-Holocene peat sequences have previously produced evidence of prehistoric activity in similar valley sequence, most notably at Shinewater, in the Willingdon Levels. Thick made-ground deposits were also identified between 0.30m and 4m close to the historical core that were poorly defined and required further field investigation.

The trenching identified modern made-ground deposits to an average thickness of 1.8m. Below this, the trenches generally exposed historical levelling deposits derived of 17th-19th century demolition. Chalk or pebble gravel layers were noted in places, where they were also associated with ground-raising episodes. The estuarine sequence was not encountered due to the 2m limit on the trench depths. No significant archaeological features or structures were encountered during these works.

The borehole survey identified a sequence of alternating silts and sandy deposits, representing estuarine sedimentation below various ground made-up layers. No evidence of peat deposits or the presence of Head gravels were noted within the samples.

The only find of note was a residual crested flint blade from the made-ground deposits within Trench 4. This could date from the upper Palaeolithic to the Neolithic, but more precise dating is not possible based on a single blade. The presence of Palaeolithic assemblages have been previously identified from peri-glacial features within the surface of the Head gravels close to the site.

Based on the results of the field investigations, the proposed scheme impacts are confined to the modern made-ground deposits, which are considered to have limited archaeological or palaeoenvironmental potential.

Newhaven Flood Alleviation Scheme, East Sussex

Archaeological Evaluation Report

Written by Andrew Ginns

with contributions from Cynthia Poole, Ian R Scott, Elizabeth Kennard, Magdalena Benysek and illustrated by Hannah Kennedy and Matt Bradley

1 INTRODUCTION

1.1 Scope of work

1.1.1 Oxford Archaeology (OA) was commissioned by JacksonHyder on behalf of the Environment Agency to undertake an eight trench evaluation and borehole survey at the site of a proposed Flood Alleviation Scheme at Newhaven. The proposed scheme comprised improvements to the existing flood defences of the town, either by newly constructed defences or as improvements to the existing scheme.

1.1.2 The evaluation proceeded a wider geoarchaeological deposit model for the scheme (OA 2016a). The model identified the need for further ground-testing by field investigations to address the levels of archaeological preservation and potential that might exists across the Scheme. Questions remained over the archaeological potential of thick deposits of 'made-ground' and the potential for palaeolithic/early prehistoric remains to be preserved within, or on, the surface of the alluvium/Head gravels. The trenches and boreholes were located along the route of the proposed new flood embankments, with a maximum impact depth of 2m.

1.1.3 The work was undertaken as a condition of Planning Permission (planning ref: LW/16/0047) in relation to conditions 5 and 6. Condition 5 stated:

"No development shall take place in Area 3 until a Construction Environment Management Plan has been submitted to and approved in writing by the Planning Authority. The approved plan shall set out the arrangements for managing all environmental effects of the development during the construction period.."

1.1.4 Condition 6 stated:

"No development shall take place in Area 4 until a Construction Environment Management Plan has been submitted to and approved in writing by the Planning Authority. The approved plan shall set out the arrangements for managing all environmental effects of the development during the construction period.."

1.1.5 A brief was set by Greg Chuter, Planning Archaeologist, East Sussex County Council, detailing the Local Authority's requirements for work necessary to discharge the planning condition; this document outlines how OA implemented those requirements.

1.1.6 All work was undertaken in accordance with local and national planning policies and East Sussex County Council Standards and Guidance for Undertaking Archaeological Works (ESCC 2015).

1.2 Location, geology and topography

1.2.1 Newhaven is a coastal town in the Lewes district of East Sussex. The town is located at the mouth of the River Ouse, which flows southwards from Lower Beeding in West

Sussex through the Low Weald and on through the chalk landscape of the South Downs to the sea at Newhaven.

1.2.2 The Newhaven FAS Area covers a total of 0.55km² (55 hectares) which has been sub-divided into five 'Scheme Areas'. These comprise two on the west bank of the river known as Scheme Area 3 - Riverside Park to Swing Bridge (west) and Scheme Area 4 - Swing Bridge (west) to West Quay, and three on the east bank known as Scheme Area 1 - Energy Recovery Facility to A26, Scheme Area 2 - Energy Recovery Facility to Swing Bridge, and Scheme Area 5 - Swing Bridge (east) to Newhaven Beach (OA 2016; Fig 4).

1.2.3 The site was situated along the western banks of the River Ouse, Newhaven, East Sussex, within Scheme Areas 3 and 4, centred on NGR TQ 4470 0110. The main evaluation area was Riverside Park, a low-lying public open space surrounded by housing to the west.

1.2.4 The solid geology along the scheme comprised Newhaven Chalk, which outcrops to the west (BGS sheet 334). The drift geology of the development area consisted of a complex sequence of estuarine alluvium and Head deposits of different ages. With the exception of the shoreline, the bulk of the very low-lying east bank was reclaimed tidal flats comprising alluvial deposits of fine silt and clay, potentially also with some peat. Similar alluvial deposits were also evident in some parts of the west bank, for example to the north of Scheme Area 3, on Denton Island, and along the edge of the river course throughout Scheme Area 4. To the west of Denton Island and in the majority of Scheme Area 4, the superficial geology was composed of clay, silt, sand and Head deposits.

1.2.5 Modern ground levels across the Scheme areas lay between approximately 3m and 6m OD, with the highest areas located in the north-western sector of the proposed Scheme. The historic core of the town is located on the west side of the river valley on a slight spur of the downs that rises from c.3m m OD at the lower end of Bridge Street to c 54m OD at the old workhouse on Church Hill (Harris 2004, 11). The settlement lies on the old coast road (A259), although this has been modified to bypass the church and, via a ring road, the town centre.

1.2.6 The historical centre of Newhaven is an archaeological notification area (ANA), which covers an area of 8.44ha (centred on TQ 4450 0137). It is crossed by Scheme Areas 3 and 4. It demarcates an area of multi-period activity, dating from the Palaeolithic to modern periods.

1.3 Archaeological and historical background

1.3.1 The archaeological and historic background to the scheme was taken from the Cultural Heritage Statement (Capita / URS 2015) and briefly reproduced in the Written Scheme of Investigation (WSI). A summary of the background relevant to the results of the evaluation has been reproduced below.

Palaeolithic period (700,000-10,000 BC)

1.3.2 The HER records four entries for Palaeolithic activity in Newhaven, including two handaxe find-spots although the exact number and location of their discovery is unclear. One is recorded as being located within ANA which is located within both Scheme Areas 3 and 4, and the other is recorded as being located approximately 100m west of Scheme Area 4.

1.3.3 Two further flint working sites, one at the Newhaven Fire Station and the other at South Way are also recorded. Excavation in the 1970s identified a large assemblage of *in-situ* flint debitage and one tool was recovered from yellow silt that filled a fissure in the Pleistocene clay and gravels. These were originally dated to the upper Palaeolithic but this has been subject to several revisions and more recently it has been suggested that they are older relating to biface manufacture of either Neanderthal or Archaic Homo Sapiens origin.

1.3.4 In 2014 an evaluation undertaken at Newhaven Fire Station, some 140m west of the South Way site, identified further flintwork again from a yellow loess deposit that filled an involution within the underlying Head gravel. Both of these sites provide possible evidence of seasonal activity and highlight the potential for deposits to survive from this period.

1.3.5 The previous geoarchaeological deposit model suggested that similar Head deposits are located close to the surface within Scheme Areas 3 and 4.

Late prehistoric period (10,000-100 BC)

1.3.6 Research in Sussex has shown that Mesolithic sites are clustered on the Head outcrops; with the coastal plain being used for seasonal hunting camps with longer-stay base camps frequently located alongside or near watercourses.

1.3.7 Evidence for human activity along the coastline mainly comprises flintwork, such as the Thames pick that has been recorded in the wider area to the south-west of Scheme Area 4. Details of the circumstances of the find and its exact location are unknown.

1.3.8 The only other recorded Neolithic evidence relates to two HER records detailing four isolated axe finds. One of these was recovered from the garden of a property in Lee Way, just 75m west of Scheme Area 3.

1.3.9 Evidence of Bronze Age activity in the area typically includes settlements and burial sites; both are known in Newhaven. At Castle Hill ANA the remains of a possible Late Bronze Age enclosure or hillfort, is known. The earthworks no longer survive, in part destroyed by the construction of the 19th century fort.

1.3.10 At Tideway School, which is on the western side of the ANA, just beyond the boundary of the area, a Bronze Age cremation in an inverted urn was discovered during terracing in 1973 for the construction of a new gymnasium. On the east bank evidence suggesting settlement is limited to a few pieces of pottery and worked flints, which were found during a watching brief at Grange Farm. A round barrow is recorded as having existed at South Heighton Caravan Park, which is to the north of the east bank.

1.3.11 Alluvium sequences recorded within the Ouse Valley may contain artefacts dating from this period or structures associated with river-edge activities, and in the later Bronze Age in Western Europe tools, weapons and ornaments were deliberately deposited in wet places such as bogs and streams.

1.3.12 The geoarchaeological watching brief undertaken in June 2015 aimed to characterise Holocene alluvium within the Ouse Valley with particular reference to the western side of Scheme Areas 3 and 4, where there is the potential for wetland edge archaeological deposits. No evidence of *in-situ* organic remains was encountered during the watching brief; however the geotechnical logs for the wider area did indicate the potential for preservation within the site.

Late Iron Age and Roman Period (100 BC – AD 407)

1.3.13 By the later Iron Age, East Sussex appears to have formed part of the territory of the Atrebate tribe, who dominated much of south-east Britain. Only two sites dating from the Iron Age period are recorded, both of which are located south of Scheme Area 4 on the cliffs of the west bank at Newhaven. Here finds of Iron Age pottery and coins have been recovered, suggesting some continuity of occupation from the Bronze Age.

1.3.14 There is clear archaeological evidence for an early Roman presence in Sussex: from Chichester, which developed into the civitas capital, and Fishbourne Palace, which is the largest known domestic Roman building in Northern Europe. Two villa sites are suspected along the west bank of Newhaven. Excavations at South Way (in ANA), revealed the partial remains of five wooden and stone buildings that were occupied during the second half of the 1st and much of the 2nd century AD (Harris 2004, 13) and 500m to the east the foundations of a flint-built structure was discovered at The Rose Walk (also in ANA) which appears to date to the 2nd – 3rd centuries. Their close proximity may mean that the two, although often individually referred to as villas, are actually buildings that form part of one large villa estate complex.

1.3.15 A third Roman settlement is also evidenced at Castle Hill where Bronze Age and Iron Age settlement has also been discovered. Here finds of Romano-British pottery, coins and other artefacts were found during levelling of the east side of Newhaven Fort in 1970. Finds of Roman date were also recovered from this area during the construction of the fort in the 1860s.

1.3.16 A road network is likely to have accompanied the development of settlements along and into the Ouse Valley but physical evidence for this is scarce, with the only known Roman road in the Newhaven area being the major London-Lewes road. However, it has been suggested by Margary (1948,185-6) that a Roman road ran from Newhaven to Selmeston and on to Dicker, and that a coastal road also ran from the Brighton area to Newhaven, passing the church and crossing the Ouse along the pre-1863 route (Harris 2004, 13). The HER records this road and its purported route would have crossed the northern part of Scheme Areas 2 and 3 and would potentially include a river crossing.

Saxon to Medieval Period (AD 407 – 1540)

1.3.17 After the final withdrawal of the Roman army from England in the early 5th century AD, when the whole country appears to have fallen into an extended period of socio-economic decline, this region appears to have been inhabited by groups of Saxons.

1.3.18 Evidence of settlement during the early medieval period is scarce in East Sussex. What little there is mainly comes from cemetery sites, which in other areas have been found to be in close proximity to settlements (Johnson and Chuter 2009, 22). There is evidence along the Ouse Valley for expansion of population and settlement around the 7th century AD (Johnson and Chuter 2009, 22). Newhaven, then known as ‘Meeching’ may have developed around this time as the Old English place-name suggests Anglo-Saxon origins (Harris 2004, 14). Archaeologically though, there is little to attest to this with just a few sherds pottery having been found at South Way in Scheme Area 4 (Harris 2004, 13) and at Newhaven Fort.

1.3.19 At Orchard Meadow, Heighton Road, Denton, to the north-east of Scheme Areas 1 and 2, pieces of quern and pottery (late Saxon, early Medieval) have been found, although not in clear association with a settlement.

1.3.20 Within the wider area there are three medieval settlements, South Heighton and Denton, to the north-east of Scheme Areas 1 and 2, and Meeching (now Newhaven) to the west of Scheme Areas 3 and 4; all of these areas are now designated ANAs. The medieval settlement of Meeching is first recorded as *Mechinges* c.1090 and *Mecinges* c.1095, which possibly means 'dwellers at mece (the sword)', referring to the long coastal spit of land deflecting the River Ouse towards Seaford during this period (Harris 2004, 14). Although archaeological evidence for this settlement is limited to a few pits found during the excavations at South Way in the 1970s, documentary evidence indicates that in 1095, a church, a mill and four acres of land were granted at Meeching by William de Warenne to the Cluniac priory of St Pancras at Lewes. The Grade II* listed St Michael's church, located south-west of Scheme Areas 3 and 4, was built around 1120. It is the only surviving medieval building in Newhaven – only the original Norman chancel, eastern tower and unusual semi-circular apse survive from the early church. Church Road, Lewes Road, and the High Street are also historic medieval streets (Sussex EUS, Newhaven).

1.3.21 By 1524, only eight taxpayers were recorded in Meeching parish, indicating that the settlement had declined following the deterioration of the Ouse Valley meadows, coastal sedimentation silting-up its harbour and the impact of the Black Death.

Post-Medieval / modern period (1540-present)

1.3.22 Large areas of the Scheme area retain a rural character, consisting of reclaimed marsh land. In 1539 a new exit for the Ouse was cut back by Castle Hill but the Armada Survey of 1587 shows that by then a small spit marked as 'beache' had accumulated and diverted the river 200m eastward. By the end of the 17th century, cartographic sources indicate that a shingle barrier had extended another 800m east, effectively closing the exit at 'Newhaven'. Instead the river reached the sea through a maze of channels and low-lying shingle banks at Tidemills, while the old river channel running towards Seaford now formed a lagoon behind the shingle beach.

1.3.23 It was not until 1731 that the western exit at Newhaven was re-excavated, and this time piers were installed in an attempt to stabilise the outlet. This proved ineffective and by 1766 shingle had again formed across the mouth. Little changed until 1791, when a short breakwater was built to the west of the harbour and the river was straightened at several points and provided with drainage sewers.

1.3.24 In the mid-19th century railway lines were introduced to Newhaven and with the arrival of these its significance as a maritime centre increased. The breakwater was improved by a groyne of over 150m and the lagoon east of Tide Mills was embanked, forming the Mill Pond in the channel feeding Mill Creek. The Salts situated between the river and the pond was a man-made inlet controlled by sluices to the creek; it was constructed for oyster cultivation until disease curtailed the industry.

Previous work

1.3.25 Previous ground investigation works in connection to or within the scheme area have been undertaken from 2004 to 2015. These have included geoarchaeological surveys and watching briefs and ground investigations. Those of greatest relevance are recounted below.

1.3.26 A geoarchaeological survey was undertaken at the ERF site (Wessex Archaeology 2004) offering an archaeological interpretation of 14 boreholes which were up to 45m deep. The chalk was recorded at a depth between 26-29m (c.-22-25m OD), over which there was found to be a thick sequence of clays, silts, sands and organic layers. These were interpreted as Holocene age alluvial deposits, some of which included marine

sediments, indicated by the identification of marine mollusc shells in sand dominated portions of the sequence. No fully developed peat layers were observed but highly organic/peaty alluvium and the presence of minerogenic layers may indicate periods of partial stabilisation and drying of the immediate landscape. The sediment types and depths were noted to be similar to the floodplain deposits near Lewes, suggesting that there is generally lateral consistency of deposits in the Lower Ouse valley.

1.3.27 A geoarchaeological watching brief was undertaken during geotechnical site investigations within Scheme Areas 1-5 in June 2015 (ASE 2015). The results of the watching brief enabled a basic deposit model of shallow Pleistocene deposits and Holocene palaeochannel margins to be constructed, which helped informed the impact assessment process.

1.3.28 Immediately prior to this evaluation a watching brief on pits dug to remove Japanese knot-weed was conducted adjacent to the proposed location of two test pits (Trenches 1 and 2). This was designed to help establish the historical make-up of the pre-existing floodbank and whether the test pitting would be necessary. Upon completion, it was determined that the flood banks were modern and did not have any historical make-up. The test pitting was therefore felt unnecessary and was abandoned with the approval of Greg Chuter, Assistant County Archaeologist for East Sussex County Council.

1.4 Acknowledgements

1.4.1 Oxford Archaeology would like to thank Tom Davies, Arcadia with JacksonHyder, acting on behalf of the Environment Agency for commissioning this project. Thanks are also extended to Greg Chuter who monitored the work on behalf of East Sussex County Council, for his advice and guidance.

1.4.2 The project was managed for Oxford Archaeology by Carl Champness. The fieldwork was directed by Andy Ginns, who was supported by Elizabeth Kennard, David Pinches and Anne-Laure Bollen. The borehole survey was carried out by CC Ground Investigations under the supervision of Magdalena Benysek. Survey and digitizing were carried out by David Jamieson and Hannah Kennedy. Thanks are also extended to the teams of OA staff that cleaned and packaged the finds under the management of Geraldine Crann and Leigh Allen. Susan Rawlings prepared the archive under the management of Nicola Scott.

2 Aims and Methodology

2.1 Aims

2.1.1 The general aims of the evaluation were:

- To determine the presence or absence of any archaeological remains which may survive within the made-ground or below.
- To determine or confirm the approximate extent of any surviving remains
- To determine the date range of any surviving remains by artefactual or other means.
- To determine the condition and state of preservation of any remains.
- To determine the degree of complexity of any surviving horizontal or vertical stratigraphy.
- To assess the associations and implications of any remains encountered with reference to the historic landscape.
- To determine the potential of the site to provide palaeoenvironmental and/or economic evidence, and the forms in which such evidence may survive.
- To determine or confirm the likely range, quality and quantity of the artefactual evidence present.

2.2 Specific aims and objectives

2.2.1 The specific aims and objectives of the evaluation were:

- To Identify and record any significant archaeological remains that might help us identify the extent of prehistoric, Roman or later activity within Newhaven's archaeological notification area (ANA).
- To investigate the nature and date of the thick made-ground deposits identified in the deposit model.
- To Investigate and characterise any evidence of early prehistoric activity at the edge of the floodplain.
- To provide baseline information to help inform or develop any further mitigation strategies for the site;

2.3 Trenching methodology

2.3.1 A total of eight stepped evaluation trenches were proposed in the WSI (OA 2016b), measuring between 2.0m by 2.0m and 5.0m by 4.0m respectively. A series of five boreholes were also proposed, to be drilled in close proximity to the evaluation trenches along the line of the proposed new flood embankment.

2.3.2 Trenches 1 and 2 were scoped out of the programme of works following the recording of modern made-ground deposits during the monitoring of pits associated with the Japanese knotweed removal and following discussion with the planning archaeologist. A single evaluation trench and an adjacent borehole (Trench 8; Borehole 5) within Area 4 were also not undertaken due to land access issues.

2.3.3 Only five stepped evaluation trenches (Trenches 3, 4, 5, 6 and 7) were excavated in the park area with an 8-tonne tracked excavator fitted with a toothless ditching bucket under the supervision of an Archaeologist. The trenches were excavated to the top of

the first archaeological horizon or to impact depth (to a maximum depth of 2m), whichever was encountered first.

2.3.4 The locations of trenches and boreholes were positioned to achieve a sufficient sample in order to help refine the site deposit modelling and to determine the character of any potential remains relating to reclamation and management of the River Ouse. It was unclear how extensive impacts from reclamation and water-management have been to palaeo-environmental remains from historic mapping and other sources. Similarly it was not possible to determine whether significant remains pertaining to earlier reclamation and management might survive within Areas 3 & 4. The requirement to resolve these matters and the location of the required interventions (test-pits and boreholes) was determined through consultation with the ESCC Planning Archaeologist and the Environment Agency.

2.3.5 During machine excavation, the topsoil / made-ground were checked for artefacts. The upper layers were taken down in spits of no more that 100mm. Recording took place from the edges of the evaluation trenches when it was safe to do so. All deposits were issued with unique context numbers and bulk finds collected by context in accordance with established best practice and the OA Field Manual. Following recording, the trenches were backfilled for health and safety reasons.

2.4 Borehole methodology

2.4.1 A programme of four boreholes were drilled with a Terrier Rig in order to obtain samples of the made-ground and upper alluvial sequences. A specialist sub-contractor (CC Ground Investigations) was employed to operate the drilling rig.

2.4.2 Each borehole was drilled until Head deposits were encountered or to a maximum depth of 5m. These had a two-fold purpose; to ensure the full impact depth was investigated should the trenching not achieve this, and to provide samples of the upper alluvial sequence for palaeoenvironmental remains and dating evidence.

2.4.3 A continuous sequence of undisturbed core samples (0.10m in diameter and 1.0m in length) were retrieved from each sampling location. The samples were logged and the data was added to the existed deposit model.

3 RESULTS

3.1 Introduction and presentation of results

3.1.1 The results of the evaluation are presented below, and include a stratigraphic description of the trenches. The full details of all trenches including dimensions and depths of all deposits can be found in Appendix A. Finds data and spot dates are tabulated in Appendix B.

3.1.2 All trenches were within the confines of riverside park. They are described in numerical order, from north to south.

3.2 General soils and ground conditions

3.2.1 The general soil sequence was fairly uniform across site, consisting of a series of levelling and/or demolition layers and made-ground deposits overlain by modern topsoil.

3.2.2 The modern made-ground formed an average of 1.8m thickness. Below that, the trenches generally exposed a levelling deposit derived of demolition and industrial waste products. Chalk or pebble layers were noted in places and were also associated with ground raising episodes.

3.2.3 The drift geology was not reached in any of the evaluation trenches.

3.3 General distribution of archaeological deposits

3.3.1 Modern deposits of made-ground were consistent across site. The underlying post-medieval levelling and/or demolition deposits were present in all but the southernmost trench, (Trench 7) where they had been truncated away by modern construction activity.

3.3.2 No archaeological features were identified during the course of the evaluation. Only a limited amount of finds were recovered from the modern made-ground and historical ground make-up deposits.

3.4 Trench 3 (Figs. 2 & 3; Plate 1)

3.4.1 Trench 3 was located in the north-west corner of the riverside park area. The base of the trench revealed a black demolition/levelling deposit, 304, comprised of sand, alluvial clay, charcoal, ash, decomposed wood and coal dust (Fig. 3, section 300). A ridge tile fragment of 18th-19th century date was recovered from the deposit.

3.4.2 The overlying deposits had a combined thickness of 1.8m and consisted of modern made-ground layers 303, 302 and 301 overlain by the topsoil 300.

3.4.3 Layer 303 was a dark grey redeposited alluvial clay containing 20th century brick rubble.

3.4.4 Layer 302 was a mid greyish brown sandy silt containing 20th century concrete and brick rubble with metal, plastic and glass fragments.

3.4.5 Layer 301 was a pale greyish brown sandy silt containing 20th century concrete and brick rubble.

3.5 Trench 4 (Figs. 2 & 3; Plate 2)

3.5.1 Trench 4 was located along the western side of the riverside park area, to the south of Trench 3.

3.5.2 A hand-dug sondage was excavated at the base of the trench to expose layer 406. This deposit was composed of 50% pale blue alluvial clay material with 50% rounded marine pebbles. This layer exhibited a degree of disturbance indicated by the presence of 20th century intrusive concrete lumps within it.

3.5.3 Overlying layer 406 was a black demolition/levelling deposit, 405, comprised of sand, pebbles, charcoal, ash, decomposed wood, rusted metal and coal dust. A brick and a brick fragment of 18th–19th century date and a brick fragment of 17th – 18th century date were recovered from deposit 405. A copper alloy strip was also recovered from this deposit.

3.5.4 Overlying layer 405 were modern made-ground deposits 404, 403, 402 and 401 and the topsoil 400. These layers had a combined thickness of 1.8m.

3.5.5 Layer 404 was a yellowish grey silty sand with chalk blocks, concrete lumps and decomposed wood.

3.5.6 Layer 403 was a mid greyish orange silty clay containing 20th century brick and concrete fragments, chalk blocks, plastic and metal lumps.

3.5.7 Layer 402 was a mid yellowish brown sandy silt containing 20th century brick and metal fragments. A single residual piece of struck flint identified as a crested blade, dating from the upper Palaeolithic to the Neolithic, was also recovered from this deposit.

3.5.8 Layer 401 was a pale greyish brown sandy silt containing 20th century bricks and metal fragments.

3.6 Trench 5 (Fig. 2)

3.6.1 Trench 5 was located along the western side of the riverside park area, to the south of Trench 4. Its base revealed a black demolition/levelling deposit, 505, comprised of sand, pebbles, charcoal, ash, decomposed wood, rusted metal and coal dust.

3.6.2 The overlying deposits had a combined thickness of 1.8m and consisted of modern made ground layers 504, 503, 502 and 501, overlain by the topsoil layer 500.

3.6.3 Layer 504 was a comprised of 'dumps' of grey ashy sand, green silty clay and brownish orange silty sand. It contained plastic, metal and charcoal.

3.6.4 Layer 503 was a dark brown sandy silt with lenses of brownish orange sand. The remnants of a concrete surface was present on this levelling deposit.

3.6.5 Layer 502 was an orangey brown clayey sand containing pebbles, 20th century bricks, plastic and metal fragments.

3.6.6 Layer 501 was a pale greyish brown sandy silt containing chalk rubble, plastic, rope and 20th century bricks and concrete.

3.7 Trench 6 (Figs. 2 & 3; Plate 3)

3.7.1 Trench 6 was located along the western side of the riverside park area, to the south of Trench 5.

3.7.2 A hand-dug sondage slot was excavated at the base of the trench to expose layer 609, which was composed of chalk blocks and dust compacted into a levelling deposit.

3.7.3 Overlying layer 609 was a black demolition/levelling deposit, 607, comprised of silt, grit, charcoal, ash, rusted metal and coal dust. A fragment of post medieval handmade moulded brick, dating from the 17th–early 19th century, was recovered from deposit 607.

3.7.4 Overlying layer 607 was a second compacted chalk block layer, 606, which was subsequently overlain by a black demolition/levelling deposit, 605. Layer 605 was a silty sand containing chalk lumps, charcoal and coal dust. Layers 609, 607, 606 and 605 may comprise a single episode of ground levelling/make-up.

3.7.5 The modern overburden layers were represented by made ground layers 604, 603, 602 and 601, overlain by the topsoil 600. These had a combined thickness of 1.5m.

3.7.6 Layer 604 was composed of course building sand mixed with brown sandy clay. It contained 20th century brick fragments.

3.7.7 Layer 603 was a comprised of 'dumps' of brownish orange silty sand and greenish grey silty clay.

3.7.8 Layer 602 was a mid greyish brown silty clay with metal and plastic fragments and 20th century bricks.

3.7.9 Layer 601 was a pale greyish brown sandy silt containing plastic and metal fragments.

3.8 Trench 7 (Fig. 2)

3.8.1 Trench 7 was located at the southern point of the riverside park area. The depth of the trench did not exceed 2.0m and did not expose deposits below those of the modern overburden layers. This was attributed to localised modern truncation.

3.8.2 The lowest deposit observed in the trench was comprised of sand and ballast gravels. Layer 704 was associated with substantial concrete remains which seemingly derived from the sea wall construction.

3.8.3 Deposit 704 was overlain by made ground layers 703, 702 and 701, subsequently overlain by the topsoil 700. These had a combined thickness of 1.4m.

3.8.4 Layer 703 was a yellowish orange sandy clay containing coal dust, concrete and glass and metal fragments.

3.8.5 Layer 702 was a greyish brown silty clay containing steel cable, glass and brick fragments.

3.8.6 Layer 701 was a pale brownish grey sandy silt containing 20th century bricks and plastic.

3.9 Borehole Survey (Plates 4-5)

3.9.1 A programme of four boreholes were drilled down to a depth of 5m below ground level (BGL) across the main impact areas of the Scheme. All boreholes identified a similar sequence of alternating alluvial and estuarine sediments below various make-up layers.

3.9.2 Estuarine sediments were present at the bottom of OABH1 and OABH2, and between over-bank deposits in OABH4 comprised mid grey to mid greyish brown very fine sandy silts, homogeneous and structureless.

3.9.3 A significant thickness of silty clay (av. 1.0m) was recorded above (in OABH1) and between (OABH2, OABH4) estuarine sands. This was a relatively homogeneous deposit comprised of soft silty clay, predominantly mid yellowish brown with orange iron mottles and occasional pockets of organic matter.

3.9.4 Graded contact between alluvial and estuarine sediments suggests a continuous sedimentation process, while colour changes reflect changing oxidation and water-levels.

3.9.5 The deposits represent a tidal sequence with estuarine flooding around the margins of the main channel. The gleyed nature of the estuarine sequence would indicate that this area was not permanently waterlogged and may have seasonally dried-out until the process of reclamation started. Absence of organics and peat deposit would suggest that it was not densely vegetated.

3.9.6 Chalk deposits were recorded in two of the boreholes. A chalk rubble deposit was recorded on top of alluvium in OABH3, and also in OABH4. Possibly these are remains of redeposited Head deposits, which outcrops just to the west of the site (BGS mapping).

3.9.7 In all four boreholes, made-ground deposits of up to 2m in thickness was present. It predominantly comprised sands and gravels with clay and various rubble of CBM, mortar, brick, pebbles of chert and flint. Successive episodes of dumping were clearly visible through sharp contacts between deposits of different colours and composition (Plates 4-5). Mostly modern layers of made-ground are a result of process of dumping material in order to create a stable and raised areas as a part of flood prevention.

3.10 Finds summary

3.10.1 The finds recovered from the evaluation trenches were cleaned, sorted and sent to the relevant specialists. The more detailed specialist reports can be found in appendix B and are briefly summarized below.

Ceramic building material (CBM)

3.10.2 While a fair amount of ceramic building material was observed during the course of the evaluation, only a small quantity was retained for dating purposes from those deposits underlying the modern overburden.

3.10.3 A total of seven fragments were retained from three trenches, weighing 412g. Of these three were post-medieval ridge tiles and the remainder brick fragments.

3.10.4 A single fragment of 20th century concrete was recovered from deposit 406 in Trench 4.

Metal

3.10.5 A single copper alloy object was recovered from deposit 405 in Trench 4.

Flint

3.10.6 A single piece of struck flint weighing 21kg was recovered from modern deposit 402 in Trench 4. This was identified as a crested blade dating from the upper Palaeolithic to the Neolithic. Crested blade are sometimes associated with Neanderthal activity, which is significant based on the finds from the surrounding area, but can also form part of later prehistoric assemblages. The discovery of the blade is notable, but does not offer significant information for the dating or the potential location of this activity.

4 Discussion

4.1 Reliability of field investigation

4.1.1 While three of the eight proposed trenches were not excavated due to access issues (Trench 8) and the results of the previous monitoring work (Trenches 1 and 2), the remaining trenches were accessible for investigation.

4.1.2 Trenches 3, 4, 5 and 6 were excavated to their maximum depth, specified in the WSI, and were successful in establishing the stratification above the maximum impact depth of the proposed development.

4.1.3 Trench 7 was also excavated to the maximum impact depth, although the proximity of services and a large concrete pad within the confines of the trench impeded its full excavation.

4.1.4 The boreholes were able to achieve their full specified depth and continuous samples were retrieved from all sample locations.

4.2 Evaluation objectives and results

4.2.1 The evaluation was successful in establishing the nature and date of the made ground and levelling deposits identified in the deposit model. In each of the five trenches accessed, this was achieved to the maximum impact depth of the proposed development.

4.2.2 The boreholes were successful in supplementing the trenching programme where deeper stratigraphic sequences could not be investigated.

4.2.3 Overall, the work programme has indicated that the proposed scheme will not adversely impact any significant archaeological or palaeoenvironmental remains which may be present below its impact depth within Riverside Park.

4.3 Interpretation and significance

4.3.1 The results of the evaluation have demonstrated recurring episodes of deliberately lain levelling deposits and ground raising activity in Riverside Park. The stratigraphic continuity observed in the excavated trenches clearly indicated widespread activity, as opposed to isolated, dumping events. This was most likely attributable to land reclamation along the banks of the River Ouse from the 18th century.

4.3.2 Late 17th century cartographic sources revealed an accumulation of sediment and shingle at the exit of the Ouse at Newhaven, effectively closing off the mouth of the river. An effort to re-excavate and subsequently stabilize the river was made in the early 18th century, although this ultimately failed and the mouth of the river closed off again by the middle of the century. The late 18th century saw a short break-water constructed to the west of the harbour, as well as a programme of works to straighten the river at several points. These measures were later improved during the mid 19th century when railway lines were introduced to Newhaven.

4.3.3 It was most likely during these events that the landscape to the west and east of the river was reclaimed and elevated. This was supported by the artefactual materials recovered from the lower stratigraphic sequences in Trenches 3, 4 and 6. Ceramic building material, namely brick and tile fragments, were dated from the late 17th to the 19th centuries.

4.3.4 Subsequent episodes of modern made-ground were identified overlying the post-medieval land reclamation. These were largely observed to contain plastics, concrete and 20th century bricks.

4.3.5 The single piece of struck flint from deposit 402 in Trench 4 was the only evidence for activity pre-dating the post-medieval period. The flint was identified as a crested blade dating from the upper Palaeolithic to the Neolithic periods and is often attributed to Neanderthal tool technology. While this may represent an important find, 402 was identified in modern made-ground deposits, indicating the flint was clearly residual and thus remained without provenance. The sterile silty nature of the deposit may indicate that this material may have originated from disturbed Head geologies.

4.3.6 The sampled alluvial sequence is just at the edge of the Head deposits overlying Chalk bedrock. The LiDAR survey (OA 2016a) indicates a low-lying park area that was dominated by estuarine silts and sands before being reclaimed from the 18th century. Limited ground raising activity is recorded in the form of dumped deposits and possibly associated with the wider re-development of the waterfronts during this period.

5 Conclusions

5.1.1 The evaluation identified two major phases of land reclamation and/or ground elevation; one in the post-medieval period and a subsequent more extensive modern ground raising activity. The work demonstrated that the vast majority of the scheme impact will be within the modern made-ground, with the 17th-18th century ground make-up deposits left largely undisturbed.

5.1.2 The boreholes confirmed that the areas and depth of the proposed impacts were well away from where the Head gravels or peat deposits close to the surface. The potential to impact deposits of Palaeolithic or prehistoric significance is therefore felt to be limited. The underlying alluvial sequence will also be largely unaffected by the proposed scheme.

Appendix A. Trench Descriptions and Context Inventory

Trench 1						
General description					**Orientation**	-
Test pit abandoned as previous monitoring work had been carried out at its proposed location.					**Avg. depth (m)**	-
					Width (m)	-
					Length (m)	-
Contexts						
Context no	**Type**	**Width (m)**	**Depth (m)**	**Comment**	**Finds**	**Date**
-	-	-	-	-	-	-

Trench 2						
General description					**Orientation**	-
Test pit abandoned as previous monitoring work had been carried out at its proposed location.					**Avg. depth (m)**	-
					Width (m)	-
					Length (m)	-
Contexts						
Context no	**Type**	**Width (m)**	**Depth (m)**	**Comment**	**Finds**	**Date**
-	-	-	-	-	-	-

Trench 3						
General description					**Orientation**	N-S
Trench devoid of archaeological features. Consists of made ground layers and levelling/demolition deposits.					**Avg. depth (m)**	2.0
					Width (m)	4.0
					Length (m)	3.20
Contexts						
Context no	**Type**	**Width (m)**	**Depth (m)**	**Comment**	**Finds**	**Date**
300	Layer	-	0.08	Topsoil	-	-
301	Layer	-	0.66	Made Ground	-	-
302	Layer	-	0.52	Made Ground	-	-
303	Layer	-	0.51	Made Ground	-	-
304	Layer	-	0.20+	Levelling/Demolition	CBM	18th – 19th century

Trench 4						
General description					**Orientation**	N-S
Trench devoid of archaeological features. Consists of made ground layers and levelling/demolition deposits.					**Avg. depth (m)**	2.0
					Width (m)	4.0
					Length (m)	5.4

Contexts						
Context no	**Type**	**Width (m)**	**Depth (m)**	**Comment**	**Finds**	**Date**
400	Layer	-	0.10	Topsoil	-	-
401	Layer	-	0.24	Made Ground	-	-
402	Layer	-	0.29	Made Ground	Flint	Upper Palaeolithic – Neolithic
403	Layer	-	0.64	Made Ground	-	-
404	Layer	-	0.30	Made Ground	-	-
405	Layer	-	0.26	Levelling/Demolition	CBM, metal object	17th – 19th century Cu alloy strip
406	Layer	-	0.14+	Levelling/Demolition		

Trench 5						
General description					**Orientation**	N-S
Trench devoid of archaeological features. Consists of made ground layers and levelling/demolition deposits.					**Avg. depth (m)**	2.16
					Width (m)	4.0
					Length (m)	6.0
Contexts						
Context no	**Type**	**Width (m)**	**Depth (m)**	**Comment**	**Finds**	**Date**
500	Layer	-	0.09	Topsoil	-	-
501	Layer	-	0.96	Made Ground	-	-
502	Layer	-	0.45	Made Ground	-	-
503	Layer	-	0.23	Levelling/Demolition	-	-
504	Layer	-	0.25	Made Ground	-	-
505	Layer	-	0.22+	Levelling/Demolition	-	-

Trench 6						
General description					**Orientation**	N-S
Trench devoid of archaeological features. Consists of made ground layers and levelling/demolition deposits.					**Avg. depth (m)**	2.0
					Width (m)	4.0
					Length (m)	5.0
Contexts						
Context no	**Type**	**Width (m)**	**Depth (m)**	**Comment**	**Finds**	**Date**
600	Layer	-	0.25	Topsoil	-	-
601	Layer	-	0.33	Made Ground	-	-
602	Layer	-	0.42	Made Ground	-	-
603	Layer	-	0.36	Made Ground	-	-

604	Layer	-	0.16	Made Ground	-	-
605	Layer	-	0.05	Levelling/Demolition	-	-
606	Layer	-	0.20	Levelling/Demolition	-	-
607	Layer	-	0.42	Levelling/Demolition	CBM	17th – early 19th century
608	-	-	-	VOID	-	-
609	Layer	-	0.05+	Levelling/Demolition	-	-

Trench 7						
General description					**Orientation**	NW-SE
Trench devoid of archaeological features. Consists of made ground layers and levelling/demolition deposits.					**Avg. depth (m)**	2.0
					Width (m)	4.0
					Length (m)	4.25
Contexts						
Context no	**Type**	**Width (m)**	**Depth (m)**	**Comment**	**Finds**	**Date**
700	Layer	-	0.10	Topsoil	-	-
701	Layer	-	0.28	Made Ground	-	-
702	Layer	-	0.65	Made Ground	-	-
703	Layer	-	0.34	Made Ground	-	-
704	Layer	-	0.70+	Made Ground	-	-

Trench 8						
General description					**Orientation**	-
Trench abandoned due to access issues.					**Avg. depth (m)**	-
					Width (m)	-
					Length (m)	-
Contexts						
Context no	**Type**	**Width (m)**	**Depth (m)**	**Comment**	**Finds**	**Date**
-	-	-	-	-	-	-

APPENDIX B. BOREHOLE LOGS

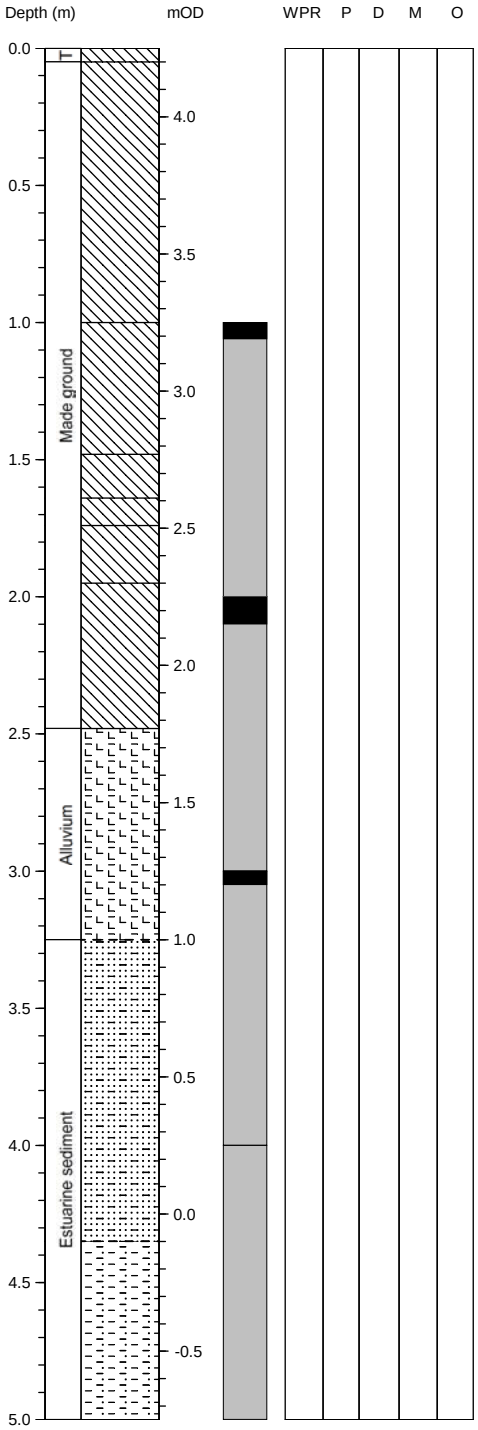
GEOARCHAEOLOGICAL SERVICES

Oxford Archaeology

SUMMARY BOREHOLE RECORD

SITE NAME:	**Newhaven FAS**	SITE CODE:	**NEFAS16**	NG EASTING:	**544706.71**	DATE:	**31.10.2016**
BH NO:	**OABH 1**	ELEVATION:	**4.25**	NG NORTHING:	**101201.55**	LOGGED BY:	**MB**

Lithology Cores Subsamples Dating Description



(0.00- 0.05) Topsoil: Loose dry mid yellowish grey silty sand, fine to medium, humic, roots present, turf on surface; lower contact clear.

(0.05- 1.00) Made ground: Loose dry dark brownish grey silty sand fine to coarse with rubble - mostly brick frag. and metal, freq. small to medium subangular to angular pebbles of chert and flint, ashy - some stones burnt; lower contact not observed.

(1.00- 1.48) Made ground: Firm mid brownish grey clay with rubble (c. 40%) - brick frag., mortar, small to large subangular to angular pebbles, occ. charcoal; made up layer; lower contact clear uneven.

(1.48- 1.64) Made ground: Loose to firm very dark greyish brown clayey sand; sand coarse, c. 40% small to large angular flint and chert pebbles, ashy; made up layer; lower contact sharp uneven.

(1.64- 1.74) Made ground: Loose light yellow sandy gravel; poorly sorted, mostly crushed mortar, freq. angular flint of different size, c. 50% of sandy fraction; lower contact sharp uneven.

(1.74- 1.95) Made ground: Moderately firm tenacious very dark grey clay; organic rich with organic smell, trace of sand, occ. charcoal, occ. small angular flint and chert pebbles, occ. CBM and mortar frag.; lower contact clear.

(1.95- 2.48) Made ground: Moderately firm mid olive grey mottled brown silty clay with rubble - freq. mortar frag., occ. brick and CBM frag., occ. charcoal, rare medium to large subrounded to subangular pebbles; colour changes within sediment - probably altering layers of disturbed alluvium (grey) and naturally deposited alluvium (brown at 2.21-2.26m and 2.32-2.35m); lower contact clear.

(2.48- 3.25) Silty clay: Firm to soft tenacious mid yellowish brown mottled grey silty clay, more grey with occ. black mottles below 2.75m, soft light olive grey with black possibly organic mottles below 3.0m, orange iron mottles 2.48-3.0m; colour changes may reflect swinging water level; lower contact graded.

(3.25- 4.35) Silty sand: Soft moist very silty fine sand (borderline between silt and sand), slightly clayey down to 3.5m; mid yellowish brown with orange iron mottles and growing amount of grey mottles from 3.75m, below 3.9m mid grey, below 4.0m mid yellowish brown and softer; colour changes my reflect swinging water level; lower contact graded.

(4.35- 5.00) Sandy silt: Moderately soft moist mid to dark grey very sandy (fine sand) silt with trace of clay (borderline between sand and silt), similar to sediment above, becomes darker and firmer below 4.65m, bottom 0.1m clayey and tenacious; structureless, homogenous, rare shell frag. and black organic mottles; not bottomed.

1.0mBGL hand dug inspection pit
T - Topsoil

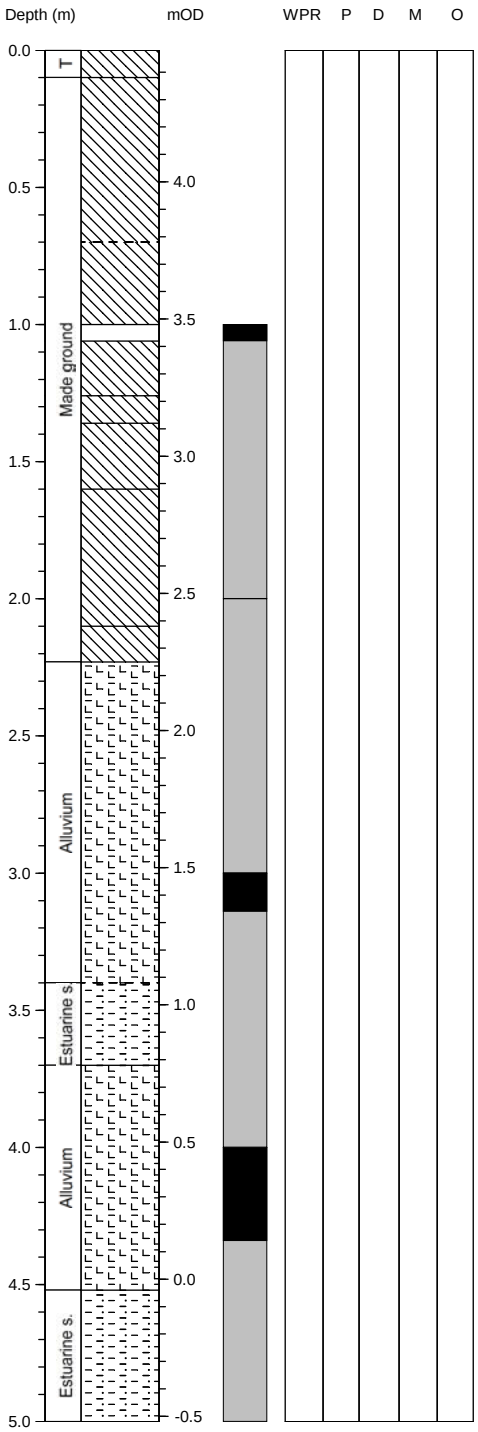
GEOARCHAEOLOGICAL SERVICES

Oxford Archaeology

SUMMARY BOREHOLE RECORD

SITE NAME: **Newhaven FAS** SITE CODE: **NEFAS16** NG EASTING: **544714.08** DATE: **1.11.2016**

BH NO: **OABH2** ELEVATION: **4.48** NG NORTHING: **101175.56** LOGGED BY: **MB**



(0.00- 0.10) Topsoil: Loose dry mid yellowish grey silty sand, fine to medium, humic, roots present, turf on surface; lower contact clear.

(0.10- 0.70) Made ground: Loose dry mid yellowish grey silty sand with abundant (c. 30%) rubble - CBM, brick frag., mortar, metal frag., occ. small to large subangular to rounded flint and mostly chert pebbles; lower contact graded.

(0.70- 1.00) Made ground: Firm moist mid olive grey clay with rubble - CBM, brick frag., mortar, occ. small to large subangular to rounded flint and mostly chert pebbles, rare angular chalk pebbles; lower contact not observed.

(1.00- 1.06) Void

(1.06- 1.26) Made ground: Loose moist dark yellowish grey silty sand with gravel, sand fine to coarse, gravel c. 40% small to large subrounded to subangular pebbles and chalk frag., rare charcoal and brick frag, rare glass frag; lower contact sharp.

(1.26- 1.36) Made ground: Moderately soft moist dark brown sandy silt, organic rich - possibly decayed wood, subtle organic smell; frag. of textile, occ. wood frag., 10mm lens of dark yellow coarse sand at the bottom; lower contact sharp.

(1.36- 1.60) Made ground: Loose dry light greyish yellow sandy gravel formed of crushed mortar and flint of different sizes; lower contact clear.

(1.60- 2.10) Made ground: Firm moist black silt, ashy with rubble - limestone frag., mortar, small CBM frag., small to large subrounded to angular pebbles; c. 50% of rubble in top 0.1m, below c. 10%; becomes clayey from 1.9m; lower contact sharp.

(2.10- 2.23) Made ground: Loose rubble - small to large angular flint, small to medium subrounded to subangular pebbles, freq. small CBM frag., c. 10% of clay; lower contact clear.

(2.23- 3.40) Silty clay: Moderately firm tenacious mid yellowish brown silty clay mottled grey and with orange iron mottles; top 0.1m dark grey mottled grey with intensive iron mottling and occ. small subangular pebbles - disturbed alluvium; down to 2.5m more grey than below and slightly organic; rare angular granules; bottom 0.3m soft, bottom 50mm light greyish brown - lower contact graded.

(3.40- 3.70) Sandy silt: Soft moist light greyish brown very sandy silt, sand very fine; homogenous, minerogenic, structureless; lower contact abrupt.

(3.70- 4.52) Silty clay: Soft tenacious mid yellowish brown silty clay mottled grey and with orange iron mottles; at 3.9-4.0m and 4.34-4.4m light greyish brown, at 4.4-4.45m a lens of light greyish brown silt; minerogenic, structureless; lower contact clear.

(4.52- 5.00) Sandy silt: Soft moist sandy silt with traces of clay, sand very fine, borderline between sand and silt; at 4.52-4.65m mid yellowish brown mottled grey with orange iron mottles, below mid brownish grey with dark grey and orange iron mottles, rare shell frag.; not bottomed.

1.0mBGL hand dug inspection pit
T - Topsoil
Estuarine s. - Estuarine sediment

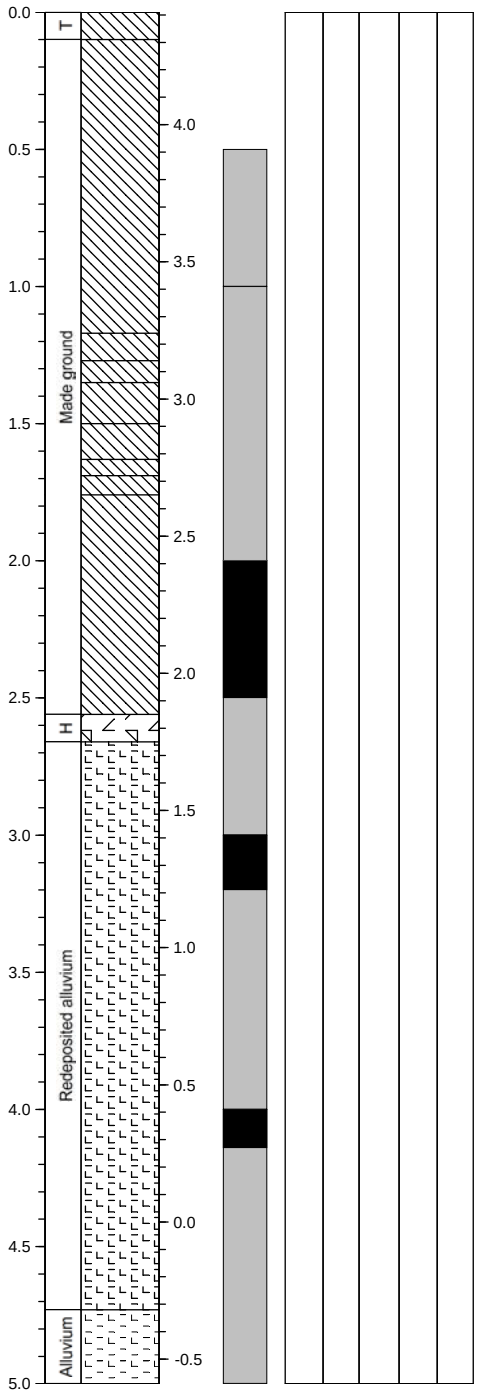
GEOARCHAEOLOGICAL SERVICES

SUMMARY BOREHOLE RECORD

SITE NAME: **Newhaven FAS** SITE CODE: **NEFAS16** NG EASTING: **544728.01** DATE: **1.11.2016**

BH NO: **OABH3** ELEVATION: **4.41** NG NORTHING: **101141.73** LOGGED BY: **MB**

Lithology Cores Subsamples Dating Description



(0.00- 0.10) Topsoil: Loose dry light greyish yellow silty sand, fine to medium, humic, roots present, turf on surface; lower contact clear.

(0.10- 1.17) Made ground: Loose to firm dry mid greyish yellow silty sand with trace of clay and very abundant rubble (c. 40%) - brick frag., CBM, concrete frag., mortar, occ. crushed flint of different sizes, occ. metal items; lower contact clear.

(1.17- 1.27) Made ground: Loose dry mid yellowish grey gravelly sand; sand fine to medium, gravel c. 40% fine to medium mostly angular pebbles of chert and flint; lower contact sharp.

(1.27- 1.35) Made ground: Loose dry light greyish yellow gravelly sand formed mostly of crushed mortar with small to large angular to subangular flint and chert pebbles; lower contact sharp.

(1.35- 1.50) Made ground: Loose dry mid brownish yellow gravelly sand, medium to coarse with horizontal beds of grey sand with irregular boundaries, quartzitic, gravel c. 10% mostly fine with small subangular to subrounded pebbles; lower contact sharp.

(1.50- 1.63) Made ground: Loose dry moist very dark brown clayey silt with gravel; organic rich - probably decayed wood, subtle organic smell; gravel c. 40% small to large angular (crushed) basalt frag., rare small angular chert and flint pebbles; lower contact sharp.

(1.63- 1.69) Made ground: Compacted moist dark brownish yellow with grey lenses silty sand with gravel; sand fine to medium, c. 30% of poorly sorted gravel - small to large subangular to subrounded pebbles; lower contact sharp.

(1.69- 1.76) Made ground: Compacted moist very dark brownish grey silty sand with gravel, ashy, sand fine to medium , c. 30% of poorly sorted gravel - small to large subangular to subrounded pebbles ; 10mm lens of coarse light yellow sand at the bottom; lower contact sharp.

(1.76- 2.56) Made ground: Loose moist very dark brown to black clayey silt with gravel, ashy, organic rich - possibly decayed wood, gravel c. 30% - small to large angular (crushed) basalt frag., medium subangular pebbles, subrounded cobbles at the bottom; lower contact wavy.

(2.56- 2.66) Chalk rubble: Firm moist light whitish yellow chalk rubble; lower contact wavy.

(2.66- 4.73) Silty clay: Moderately soft to soft tenacious silty clay; down to 3.8m mostly mid yellowish brown mottled grey with occ. black mottling, 3.8-4.4m dark grey mottled light grey and brown, 4.4-4.73m black and mid bluish grey in equal proportions; becomes softer and more silty with depth; organic rich where black mottles present, subtle organic smell, occ. pockets of very dark brown organic silt; occ. small to large angular pebbles (mostly at 3.0m and 4.78-4.88m), rare small CBM frag., top 0.1m with freq. large subangular pebbles; lower contact clear.

(4.73- 5.00) Clayey silt: Soft mid grey occ. mottled black clayey silt with subtle organic smell and small amount of dispersed organic matter, occ. plant remains, homogenous, structureless; not bottomed.

0.5mBGL hand dug inspection pit
T - Topsoil
H - Head deposit

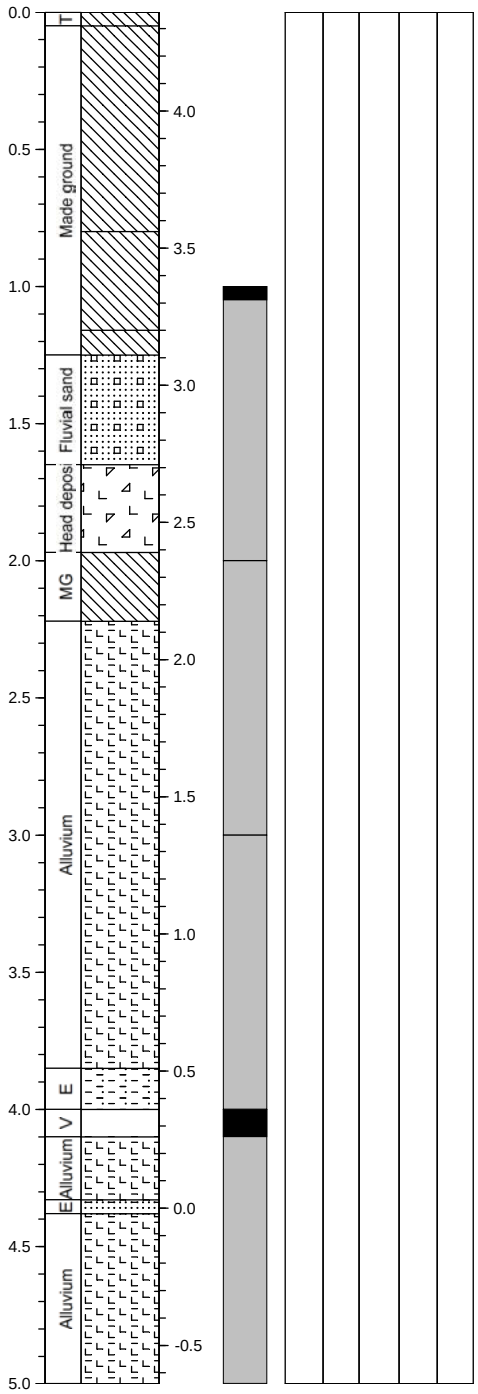
GEOARCHAEOLOGICAL SERVICES

SUMMARY BOREHOLE RECORD

SITE NAME: **Newhaven FAS** SITE CODE: **NEFAS16** NG EASTING: **544732.96** DATE: **1.11.2016**

BH NO: **OABH4** ELEVATION: **4.36** NG NORTHING: **101115.18** LOGGED BY: **MB**

Lithology Cores Subsamples Dating Description



(0.00- 0.05) Topsoil: Loose dry mid yellowish grey silty sand, fine to medium, humic, roots resent, turf on surface; lower contact clear.

(0.05- 0.80) Made ground: Loose to firm dry mid yellowish grey silty sand with very abundant (c. 40%) rubble - brick frag., CBM, concrete frag., small to medium angular to rounded flint pebbles; lower contact not observed.

(0.80- 1.16) Made ground: Moderately firm moist mid yellowish grey clayey silt with sand and rubble (c. 40%) - brick frag., CBM, concrete frag., small to medium angular to rounded flint pebbles, chalk frag.; lower contact sharp.

(1.16- 1.25) Made ground: Firm moist very dark greyish brown clayey silt with mid grey pockets, slightly organic with occ. wood frag., occ. small glass frag., rare small CBM frag.; lower contact sharp.

(1.25- 1.65) Gravelly sand: Loose dry dark greyish yellow to mid greyish yellow (below 1.46m) gravelly sand, medium to coarse; c.10% of gravel in top 0.2m, c. 5% below - small to medium subangular to angular pebbles, occ. angular flint, large wood frag. at 1.44m, occ. Small shell frag especially in bottom 0.2m, where also sand well sorted; lower contact clear.

(1.65- 1.97) Clay with chalk: Firm moist mid grey silty clay with chalk rubble (c. 30%), occ. angular flint pebbles; lower contact sharp.

(1.97- 2.22) Made ground: Moderately firm moist very dark grey to black silty sand with trace of clay and abundant (c. 40%) small to large subrounded to angular pebbles - mostly flint and chalk, rare small CBM frag., rare glass; lower contact abrupt.

(2.22- 3.85) Silty clay: Moderately soft tenacious silty clay; down to 2.63m very dark grey mottled yellowish brown with orange iron mottles, slightly organic, below 2.63m mid yellowish brown mottled grey with orange iron mottles from 3.1m, from 3.45m light grey, 3.54-3.67m mid grey with black organic mottles and small dark brown pockets of organic silt and rare plant remains, below 3.67m rare organic pockets; lower contact clear.

(3.85- 4.00) Sandy silt: Moderately soft mid yellowish brown mottled grey sandy silt, sand very fine, almost equal proportion of sand and silt; occ. orange iron mottles, homogenous; lower contact not observed.

(4.00- 4.10) Void

(4.10- 4.33) Silty clay: Soft tenacious moist to wet mid yellowish brown mottled grey with orange iron mottles silty clay; 4.18-4.24m mid grey with organic black mottles and small pockets of dark brown organic silt and rare plant remains, rare organic pockets also present below; lower contact clear.

(4.33- 4.38) Silty sand: Soft moist mid yellowish brown mottled grey with orange iron mottles sandy silt, sand very fine - borderline between sand and silt; homogenous; lower contact clear.

(4.38- 5.00) Silty clay: Soft tenacious mid grey silty clay; top 80mm mid yellowish brown mottled grey with orange iron mottles, very silty down to 4.7m, below black organic mottles present, rare small shell frag; not bottomed.

1.0mBGL hand dug inspection pit
T - Topsoil, MG - Made ground, E - Estuarine deposit, V - Void

APPENDIX C. FINDS REPORTS

C.1 Ceramic building material

Identified by Cynthia Poole

Context	Description	Date
304	3 fragments post medieval ridge tile, 13g	18th – 19th century
405	1 brick surface, 1 post medieval brick fragment, 1 fragment of brick, 362g	18th – 19th century 17th – 18th century
406	1 piece concrete,22g	20th century
607	1 fragment post medieval brick, hand made and moulded, 37g	17th – early 19th century

C.2 Metalwork

By Ian R Scott

There is single metal find from context 405.

Context	Description	Date
405	Narrow strip of copper alloy with no signs of decoration or nail or pin holes. The strip appears to be hand- rather than machine-made. It is twisted and bent, and originally was c. 189-190mm long and is 5mm wide.	This object cannot be closely dated

C.3 Flint

By Elizabeth Kennard

Introduction and methodology

C.3.1 A single struck flint was recovered from this evaluation, found within modern made ground 402 in Trench 4.

C.3.2 The flint from made ground 402 is a dual fully crested blade. The technology utilised was hard-hammer percussion and it displayed a narrow plain platform and multiple flaking pattern. There was no evidence of any platform preparation.

C.3.3 The piece displayed moderate edge damage, with potential use wear on its left edge. Modern damage is seen on the dorsal ridge, caused by the machine during excavation.

C.3.4 The assemblage shows potential Upper Palaeolithic to Neolithic activity. However, due to the nature of the fill it is worth noting that it could have been brought in from elsewhere. The flint is moderately fresh and is clearly out of place in a modern context.

Context	type	sub-type	notes	date
402	Crested blade	Dual full	On distal trimming blade, hard hammer, plain platform, hinge terminus. Machine damage on crest. Edge damage moderate, possible use L, light cortication	

APPENDIX D. BIBLIOGRAPHY AND REFERENCES

ASE 2015. A geoarchaeological watching brief at Newhaven Flood Alleviation Scheme, East Sussex. Archaeology South East.

Bell, M. 1976. The excavation of an early Romano-British site and Pleistocene landforms at Newhaven. *Sussex Archaeological Collections* 114: 218–305.

Capita / URS 2015 Cultural Heritage Statement

ESCC. 2015. East Sussex Standards and Guidance for Undertaking Archaeological Work.

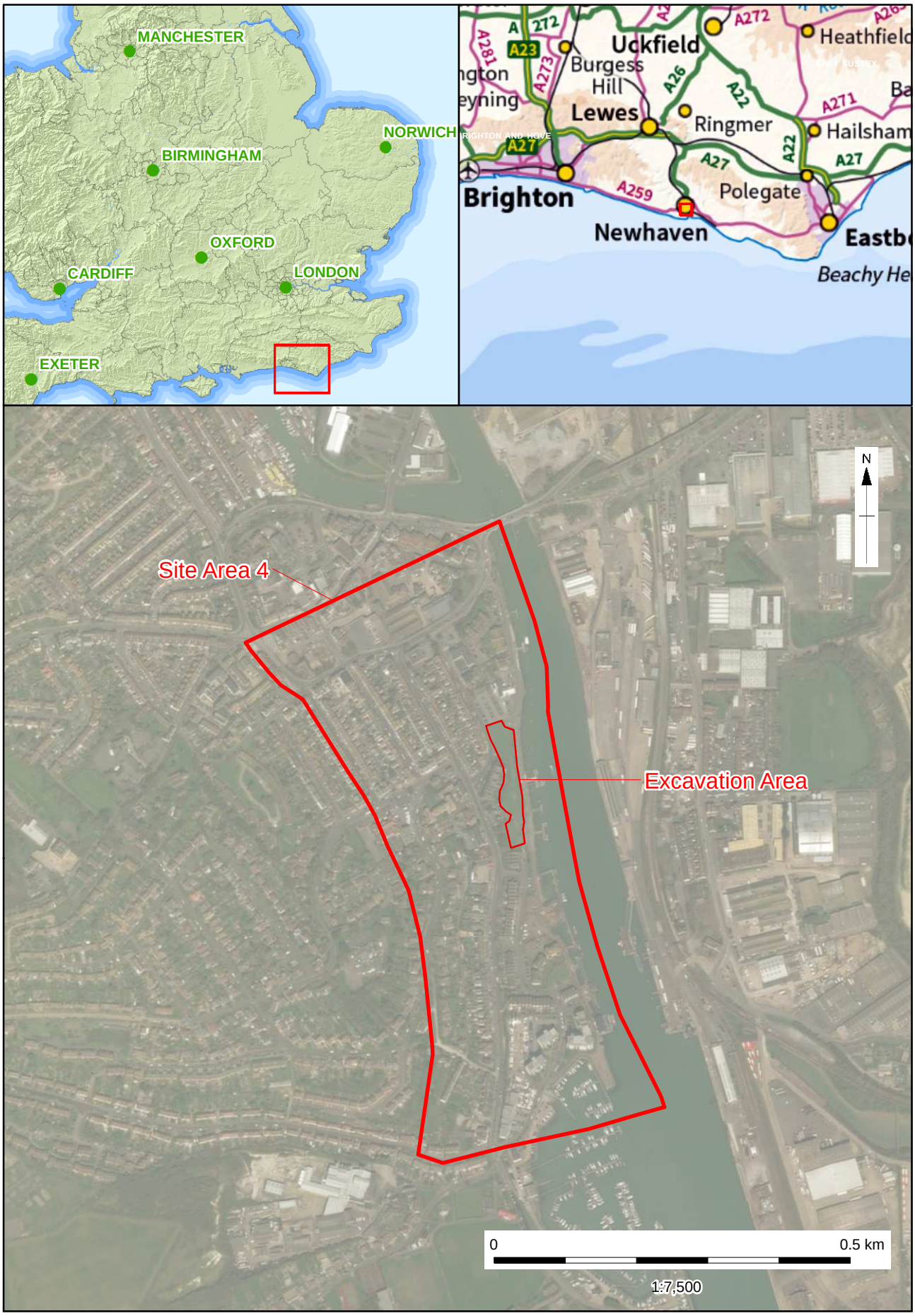
OA 2016a. *Newhaven Flood Alleviation Scheme, East Sussex: Geological Deposit Model.* Oxford Archaeology.

OA 2016b. *Newhaven Flood Alleviation Scheme, East Sussex: Written Scheme of Investigation for Archaeological evaluation.* Oxford Archaeology.

Wessex Archaeology. 2004. *North Quay, Newhaven Evaluation, geotechnical analysis*. *Report number: no. 56310.02*

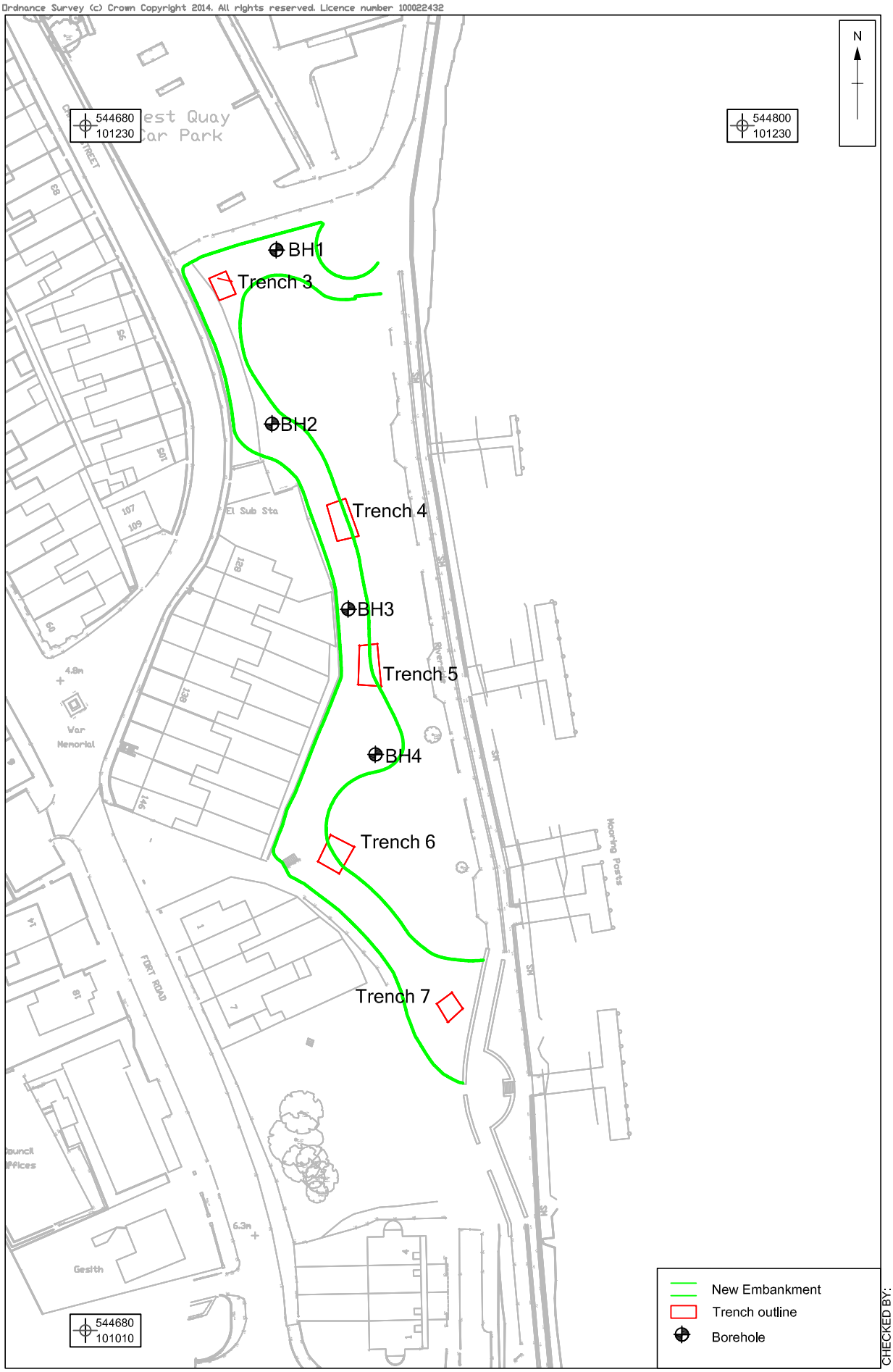
Appendix E. Summary of Site Details

Site name:	Newhaven Flood Alleviation Scheme, East Sussex
Site code:	NEFAS16
Grid reference:	NGR TQ 447 011
Type:	Evaluation
Date and duration:	October 2016
Area of site:	n/a
Summary of results:	*The trenching identified modern made-ground deposits to an average thickness of 1.8m. Below this, the trenches generally exposed historical levelling deposits derived of 18th -19th century demolition. Chalk or pebble gravel layers were noted in places, these were also associated with ground raising episodes. The estuarine sequence was not encountered due to the 2m limit on the trench depths. No significant archaeological features or structures were encountered during these works.* *The borehole survey identified a sequence of alternating silts and sandy deposits, representing estuarine sedimentation below various ground made-up layers. No evidence of peat deposits or the presence of Head gravels were noted within the samples.* *The only find of note was a residual crested flint blade from the made-ground deposits within Trench 4. This could date from the upper Palaeolithic to the Neolithic, but more precise dating is not possible based on a single blade. The presence of Palaeolithic assemblages have been previously identified from peri-glacial features within the surface of the Head gravels close to the site. Based on the results of the field investigations, the proposed Scheme impacts are confined to the modern made-ground deposits, which are considered to have limited archaeological or palaeoenvironmental potential.*
Location of archive:	*The archive is currently held at OA, Janus House, Osney Mead, Oxford, OX2 0ES, and will be deposited with the Barbican House Museum, Lewes. Currently the museum is not accepting deposition, the achieve will therefore be retained by OA until an appropriate solution is found.*



X:\n\Newhaven FAS East Sussex\010Geomatics\03 GIS Projects\NEFLASMAIN_Newhaven_Figure1_2016-12-07.mxd*matt.bradley*07/12/2016

Figure 1: Site location



Survey Data supplied by :
David Jamieson 01/11/16

0 50 m

Scale at A4 1:1000

Figure 2: Trench locations in Riverside Park

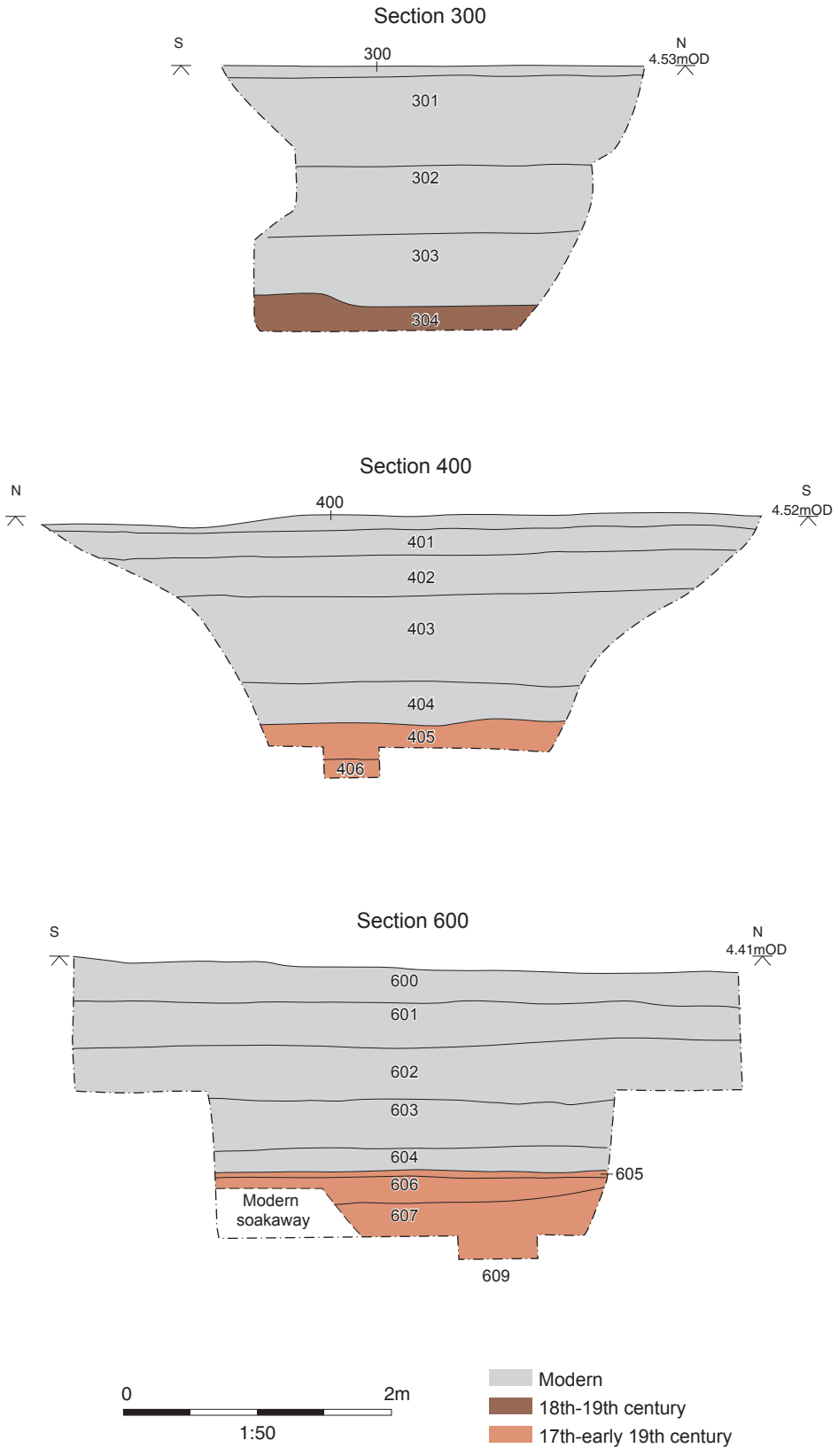
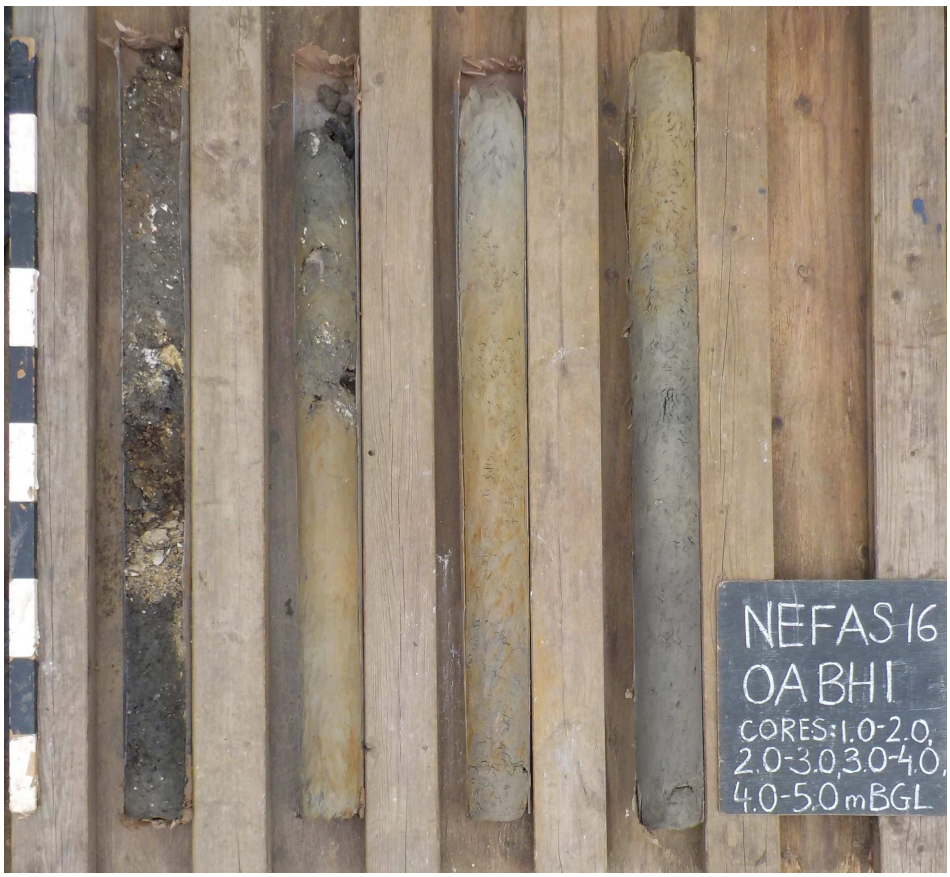


Figure 3: Sections 300, 400 and 600

Plate 1: Trench 3; section 300, facing south-west

Plate 2: Trench 4; section 400, facing east

Plate 3: Trench 6, section 600, facing north-west



Borehole sequence OABH1 (1m scale)

Borehole sequence OABH2 (1m scale)

Plate 4: Borehole sequences OABH1-2

Borehole sequence OABH3 (1m scale)

Borehole sequence OABH4 (1m scale)

Plate 5: Borehole sequences OABH3-4

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