

A228 Stoke Bridge, Main Site, South Field and Cooling Marshes, Kent

An Archaeological Post Excavation Assessment Report

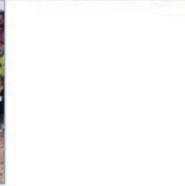
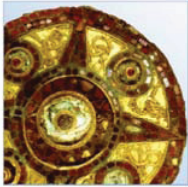
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Stoke Bridge, Main Site, South Field and Cooling Marshes, Kent: An Archaeological Post-Excavation Assessment Report

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This document has been prepared in accordance with AOC standard operating procedures.

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Non-Technical Summary

An Archaeological Strip, Map and Sample investigation was carried out at the Stoke Bridge Main Site, South Field and Cooling Marshes Site, Kent by AOC archaeology between the 1st September and 12th November 2010; the work was undertaken on behalf of Mott MacDonald.

The fieldwork comprised monitoring the topsoil and subsoil strip of the Main Site and the excavation of Test Pits. Groundworks, including geoarchaeological boreholes, were also monitored in the South Field and Cooling Marshes site.

Natural gravels were observed in the Main Site at a depth between 0.90m and 2.20m and were overlain by subsoil deposits and topsoil. Further to the east and in the South Field alluvial clays were observed up to 3.30m thick. The limited groundworks conducted on the Cooling Marshes site revealed alluvial clay overlain by a sequence of subsoil and topsoil.

Roman pottery was retrieved from the subsoil on the Main Site along with a single unstratified sherd of Iron Age pottery. The geoarchaeological investigation indicated that the area was likely to have been relatively open and subject to frequent flooding events, beginning during the Mesolithic period and continuing into the modern period.

The results are deemed to be of local significance. No further analysis or formal publication is recommended. A short summary report will be submitted to the Archaeologia Cantiana journal and publication of the site data will also be made through the Archaeological Data Service OASIS form.

1. Introduction

- 1.1 This report documents the results of an archaeological and geoarchaeological investigation conducted at Stoke Bridge; the investigations were undertaken in three localities: on the Main Site, at South Field and at Cooling Marshes (Figure 1). The Main and South Fields Sites were centred on National Grid Reference (NGR) TQ 8426 7580. The total area of the combined sites was irregularly shaped and followed the A228 Grain Road, which ran to the north of the site;. The site was bounded to the east, south and west by agricultural land and was bisected by the Mineral Railway, a working freight railway. The combined sites measured approximately 6.5 hectares.
- 1.2 Development at the Main Site comprised the construction of a bridge to replace the level crossing where the A228 is cut by the Mineral Railway. The works included excavations for piling, the re-routing of services and the excavation of environmental waterways in the South Fields area to compensate for the loss of habitat for water voles on the Main Site (Figure 2).
- 1.3 The Cooling Marshes Site was located approximately 10 km northwest of the Main Site; it was bounded on all sides by pastoral farmland (NGR TQ 7584 7831). The Cooling Marshes Site was irregularly shaped and measured approximately 2.8 hectares. The works in this area comprised the excavation of a series of 'scrapes' for the compensation of habitat lost on the Main Site, specifically for birds (Figure 3).
- 1.4 The archaeological investigations were conducted by a team of professional archaeologists.

2. Planning Background

- 2.1 The local planning authority is Medway Council; advice to the council is provided by Ben Found, archaeological officer with Kent's Historic Environment Service.
- 2.2 Planning permission to undertake the development was granted for the Main Site and South Field in 2010 (Ref. No.: MC/10/0990), subject to conditions under Planning Policy Statement 5 (PPS 5). Condition 7 states:

"Prior to the commencement of development the applicant, or their agents or successors in title, shall secure the implementation of a programme of archaeological work in accordance with a written specification and timetable which must be submitted to and approved by the Local Planning authority. The works must be undertaken in accordance with this programme unless otherwise agreed in writing with the Local Planning Authority."

"Reason: To ensure that features of archaeological interest are properly examined and recorded in accordance with Policy BNE21 of the Medway Local Plan."

- 2.3 Planning permission to undertake the development was also granted for the Cooling Marshes Site in 2010 (Ref. No.: MC/10/0979), subject to conditions under Planning Policy Statement 5 (PPS 5). Condition 7 states:

"Prior to the commencement of development the applicant, or their agents or successors in title, shall secure the implementation of a programme of archaeological work in accordance with a written specification and timetable which must be submitted to and approved by the Local Planning Authority. The works must be undertaken in accordance with this programme unless otherwise agreed in writing with the Local Planning Authority."

"Reason: To ensure that features of archaeological interest are properly examined and recorded in accordance with Policy BNE21 of the Medway Local Plan."

- 2.4 The first stage of archaeological investigation for the project was a desk-based assessment undertaken in 2008 (MoLAS 2008). This document recommended a programme of archaeological work. Kent County Council's Archaeology Officer required an archaeological strip, map and sample programme be undertaken due to the impact of the proposed development's foundations on the Main Site; and on the excavations of the environmental waterways and 'scrapes' on the South Field and Cooling Marshes sites.
- 2.5 A Written Scheme of Investigation (WSI) was prepared as a method statement for the archaeological work on each site (Mott MacDonald 2010b and c), which was approved by the monitor, Ben Found of Kent's Historic Environment Service.

3. Geology and Topography

- 3.1 Drift deposits cover the majority of the Hoo Peninsula. Alluvium is found at the surface in the eastern and north western parts of the peninsula, whilst Terrace Gravels and Head deposits are found covering the central parts. Groundwater has been found to occur within the drift deposits.
- 3.2 Solid geology is exposed in the south western parts of the peninsula. The London Clay covers the majority of the exposed geology, but the underlying Blackheath and Oldhaven Beds, the Woolwich Beds, Thanet Beds and Upper Chalk are also found exposed in the area.
- 3.3 The site is low-lying and relatively flat, lying between 1.0 and 2.0m AOD.

4. Archaeological and Historical Background

- 4.1 The coastal marshes of North Kent were formed by a series of marine transgressions and regressions from the post-glacial period to recent times. This has created a series of sedimentary layers comprising peats and estuarine muds and clays. Archaeological deposits could be present within these alluvial layers – for example Mesolithic landsurfaces have been recorded in the peat layers on the Isle of Grain; however this continual flooding of the area would have made it unsuitable for settlement during the later prehistoric period.
- 4.2 The area was utilised to greater effect in the Roman period, when the climate was warmer and dryer and attempts were made to drain areas of the marsh. Evidence for salt production and pottery manufacture has been found on the Hoo Peninsula.
- 4.3 With sea level rises, the area is likely to have reverted to marshland during the medieval period, although attempts to drain this may have been made to allow seasonal grazing. The Cooling Marshes site is likely to have been under agriculture throughout the post-medieval period up to the present day. This lack of development on the site means that any earlier archaeological deposits, if present, are likely to have remained undisturbed.

5. Research Aims

- 5.1 The objective of this investigation was to identify, excavate, record and analyse any significant archaeological remains that may be disturbed by the proposed development. This will preserve the archaeological resource 'by record' and offset the loss of the historic resource caused by the development.
- 5.2 Specifically, the objective of the Strip, Map and Sample approach was to understand the broad pattern of settlement dynamics and how key elements of the archaeological landscape (sites, activities, deposits and finds) relate to each other spatially, functionally and chronologically (KCC 2006).

- 5.3 The Strip, Map and Sample sought to:
- Establish a broad phased plan of any archaeology revealed following the stripping of the site;
 - Provide a refined chronology of the archaeological phasing;
 - Investigate the function of structural remains and the activities taking place within and close to the site.
- 5.4 The archaeological investigation sought to understand the context of the findings in relationship to the wider settlement pattern, landscape, economy and environment. Specific research aims for the investigation were as follows;
- Are there any Roman burials/cremations on the site, and if so are they isolated burials or part of a cemetery?
 - Is there any evidence for Roman industrial or settlement activity?
 - Is there any evidence for agricultural remains from the medieval or post-medieval periods?

6. Methodology

- 6.1 All machine stripping of overburden soils was carried out under constant archaeological direction by a suitably experienced archaeologist familiar with the ground conditions anticipated on the investigation site.
- 6.2 Care was taken to avoid damage to buried surfaces by manoeuvring of plant on un-stripped areas of the site. All machining was carried out with a toothless bucket; overburden was removed in 0.10m spits.
- 6.3 Plans of stripped areas were drawn at an appropriate scale and related to the OS grid. Sections were drawn at a scale of 1:20 and were tied into the ordnance datum.
- 6.4 All features, layers and deposits were recorded on pro form context sheets. All recording was in accordance with the standards and requirements of the Museum of London's *Archaeological Field Manual* (MoL 1994).
- 6.5 The full methodology can be found in the written schemes of investigation (Mott MacDonald 2010a and b).
- 6.6 The boreholes were excavated using a Copco Cobra 2 stroke percussion engine and Eijkelkamp gouge set. The boreholes were excavated by trained Quaternary Scientific Staff.
- 6.7 All sampling was conducted by Quaternary Scientific. As the cores were extracted, they were labelled with the site name, location, depth and orientation. The core samples were transported to Reading University for storage to prevent sample deterioration.

7. Summary of Results

7.1 Main Site

- 7.1.1 The Main Site was located immediately to the south of the A228 Grain Road (Figure 2). The work conducted on the Main Site consisted of a topsoil strip and in the south of the site a subsoil strip for the construction of a site compound; this area measured approximately 3800m².

Context	Height m OD	Thickness	Description
1001	2.63m - 2.51m	0.20m	Topsoil
1002	2.40m	0.20m - 0.40m	Subsoil
1003	2.10m	0.10m +	Subsoil

- 7.1.2 The lowest horizon observed was subsoil deposit (1003); this consisted of firm mottled dark orangey brown silty clay at least 0.10m in depth. This deposit was only observed in the south of the Main Site at a height of c.2.10m OD. This deposit was overlain by a second subsoil deposit (1002), a firm dark brownish grey silty clay 0.20m – 0.40m thick, observed across the whole site. This deposit contained sherds of late 19th/early 20th century pottery as well as residual Roman sherds. Peg tile, green bottle glass, burnt flint, animal bone and a post-medieval copper alloy belt buckle were also recovered. Of note were sherds of pottery which read 'OBE, SHIP INN, STOKE'; the Ship Inn still stands in Lower Stoke to the west of site, but is now closed.
- 7.1.3 Deposit (1002) was overlain by 0.20m of dark grey sandy clay topsoil (1001), this deposit contained sherds of late 19th/20th century pottery. No archaeological features were observed during the subsoil and topsoil strip.
- 7.1.4 A single sherd of unstratified Iron Age pottery was collected from a spoil heap in the centre of the Main Site.
- 7.1.5 In the east of the Main Site a series eight of test pits were excavated to reveal various services (Figures 2 and 3).

Test Pit 1 (TP1)

- 7.1.5 Test Pit 1 was located in the east of the Main Site and targeted to trace a large gas main; it measured 3.00m x 3.00m and 2.60m deep. The lowest deposit encountered at -0.17m OD was a firm mid bluish grey alluvial clay (4002); this deposit was at least 0.40m thick. It was sealed by 1.20m thick mid brownish yellow silt clay alluvial deposit (4001). The alluvium was overlain by 0.70m of mid brown clayey silt made ground containing frequent modern pottery and ceramic building material (CBM) (4003). The made ground was sealed by 0.20m of dark brown clayey silt topsoil (4000). No archaeological features or finds were observed in this test pit.

Test Pit 2 (TP2)

- 7.1.6 Test Pit 2 was located to the southeast of Test Pit 1 and was again centred on a gas main; it measured 2.00m x 2.00m in plan and was 1.80m deep. The lowest observed deposit was an alluvial deposit (4001) 0.80m thick; this was observed at a height of 1.04m OD and was sealed by 0.80m of made ground (4003); this was in turn overlain by 0.20m of topsoil (4000). No archaeological features or finds were observed in this test pit.

Test Pit 3 (TP3)

- 7.1.7 Test Pit 3 again targeted a gas main and was located southwest of Test Pit 2; it measured 3.00m x 3.00m x 2.00m. The lowest recorded deposit was alluvial layer (4002) 0.20m thick, which was observed at a height of 0.85m OD; this was sealed by second alluvial deposit (4001), which was 1.00m thick. Once again the alluvium was sealed by 0.60m thick made ground (4003) and 0.20m thick topsoil (4000). No archaeological features or finds were observed in this test pit.

Test Pit 4 (TP4)

7.1.8 Test Pit 4 was located in the far east of the Main Site and measured 3.00m x 3.00m x 2.60m. The lowest encountered deposit was alluvium (4001) at a height of 0.44m OD and 1.20m thick. This was overlain by 0.50m of made ground (4003) and 0.35m of topsoil (4000). No archaeological features or finds were observed in this test pit.

Test Pit 5 (TP5)

7.1.9 Test Pit 5 was located in the east of the Main Site over a rising water main; it was aligned east-west and measured 8.00m x 1.00m x 3.50m. The lowest recorded deposit was alluvium (4002) at a height 0.22m OD and 1.90m thick. This deposit was overlain by 1.20m of alluvium (4001) and 0.40m of topsoil (4000). No archaeological features or finds were observed in this test pit.

Test Pit 6 (TP6)

7.1.10 Test Pit 6 was located in the north of the Main Site over a petroleum pipe and measured 2.00m x 2.00m x 1.60m. The natural orange gravel (4007) was encountered at a height of 1.10m OD. It was overlain by 1.0m of dark greyish brown silty clay made ground (4004) which contained CBM flecks. This deposit was sealed by 0.20m of topsoil (4000). No archaeological features or finds were observed in this test pit.

Test Pit 7 (TP7)

7.1.11 Test Pit 7 was located to the east of TP6 over the same pipeline, it measured 2.00m x 1.00m x 1.40m. Natural gravel (4007) was observed at a height of 1.30m OD and was sealed by a thin deposit of pale grey sandy clay made ground (4005) 0.12m thick. This context was overlain by 0.60m of made ground (4004), which was in turn sealed by 0.20m of topsoil (4000). No archaeological features or finds were observed in this test pit.

Test Pit 8 (TP8)

7.1.12 Test pit eight was located to the east of TP7 and over the same pipeline, it measured 2.00m x 1.00m x 1.00m. The natural gravel (4007) was observed at a height 1.08m OD; this was overlain by 0.66m of pale brown clay subsoil (4006). This deposit was in turn sealed by 0.15m of topsoil (4000). No archaeological features or finds were observed in this test pit.

7.2 South Field Site

Context	Height m OD	Thickness	Description
2001	1.78m	0.20m	Topsoil
2002	1.58m	0.40m	Subsoil
2003	1.18m	1.00m	Alluvium
2004	0.18m	0.65m	Alluvium
2005	-0.47m	0.08m	Alluvium
2006	-0.55m	0.20m +	Possible land surface
2007	1.25m	1.00m	Alluvium

7.2.1 The South Field Site was located 270m south of the Main Site (Figures 2 and 4), the work in this area consisted of the excavation of ditches and ponds for the replacement of water vole habitat impacted by the project. The site measured 4500m². The design of this project changed a number of

times during excavation with the originally planned ditches being backfilled after excavation to be replaced with ponds connected by wide ditches.

- 7.2.2 The lowest recorded deposit, a greenish brownish yellow sandy clay (2006), was observed at a height of -0.55m OD. This deposit may have been an old land surface and was only visible in a small sondage in the west of the site. This material was sealed by a thin layer of mid grey sandy clay with occasional black organic material (2005); this deposit was 0.08m thick and contained no finds.
- 7.2.3 Deposit (2005) was sealed by mid bluish grey alluvial clay deposit (2004), 0.65m thick; this deposit was overlain by a mid brown clay alluvium (2003), which was 1.00m thick. Both of these deposits contained no finds. Alluvium (2003) was sealed in the centre and east of the site by another alluvial deposit (2007), a firm grey clay up to 1.00m thick.
- 7.2.4 The entire area was sealed by 0.40m of dark bluish grey silty clay subsoil (2002) and 0.20m of soft dark brown silty clay topsoil (2001). No archaeological features were encountered in the South Field site. Deposit (2002) contained a partial, articulated skeleton of a sheep, presumably of post-medieval date. Context (2001) contained pottery of late 19th/early 20th century date, CBM, bottle and window glass and animal bone.

7.3 Cooling Marshes Site

Context	Height m OD	Thickness	Description
2001	2.05m	0.25m	Topsoil
2002	2.30m	0.15m	Subsoil
3003	2.45m	0.20m	Alluvium

- 7.3.1 This site was located approximately 2km north of the village of Cooling in an area of open grassland (Figures 1 and 5). The work in this area was designed to replace the habitat for birds lost during the main project and involved the excavation of shallow 'scrapes' with connecting shallow waterways.
- 7.3.2 The lowest deposit encountered in this area was alluvial deposit (3003), a mid greyish brown clay containing modern CBM, it was at least 0.20m thick and was observed at a height of 2.45m OD ground level. The alluvium was overlain by subsoil deposit (3002), a firm mid brown, silty clay 0.15m thick; this was sealed by a 0.25m thick deposit of dark brown clayey silt topsoil (3001). No archaeological features or finds were observed in the Cooling Marshes Site.

7.4 Geoarchaeological Boreholes

- 7.4.1 Six boreholes were dug in the Main Site in the area of the bridge piers by Quaternary Scientific (QUEST). These boreholes provided a 240m long rough transect across site. The full details of the lithostratigraphic sequence can be found in Appendix C.
- 7.4.2 The boreholes and subsequent lithostratigraphic analysis (Appendix C) show that the west of the site (Borehole 1, 2 and 3) lies within a relatively undisturbed area of natural sands and gravels overlain by subsoil and topsoil. The natural gravels were encountered at 2.00m OD in Borehole 1, 1.75m OD in Borehole 2 and 1.83m OD in Borehole 3. In Borehole 3, the natural sands were sealed by a dark grey silty clay subsoil 0.23m thick. This was overlain by a 0.77m thick deposit of brownish grey silty clay subsoil, this deposit overlay the natural sands in Boreholes 1 and 2. All three borehole samples were capped by dark brown silty clay topsoil deposits between 0.30m and 0.42m thick.

- 7.4.3 The boreholes to the east of the railway line (Borehole 4–6) demonstrated a very different stratigraphy to Boreholes 1-3. Natural sands and gravels were encountered at -0.50m OD in Boreholes 5 and 6, and -0.87m OD in Borehole 4.
- 7.4.4 The natural sands and gravels were sealed by alluvium in all three boreholes (for more details see Appendix C); this alluvium was 2.75m thick in Borehole 4, 3.10m in Borehole 5 and 2.85m Borehole 6. In all cases the alluvial sequence was overlain by made ground between 0.52m and 1.28m thick. This sequence is similar to that seen in Test Pits 1-5.

8. Summary of Finds and Analysis of Potential

8.1 Finds (Appendix B)

Pottery

- 8.1.1 The assemblage consisted of 44 sherds of pottery, which were recovered from three contexts on the site (1001), (1002) and (2001) as well as a single unstratified sherd. The oldest pottery was a single unstratified sherd of probable Iron Age pottery found in the Main Site. This area also yielded sherds of Roman redware and greyware which were residual in subsoil (1002); this context also contained stoneware jars and English porcelain tablewares. Given that the pottery is mainly unstratified or residual the assemblage has very limited significance and potential.

Ceramic Building Material

- 8.1.2 Three pieces of CBM were retrieved from two contexts (1002) and (2001). Two of these pieces were peg tile, while the other was a fragment of post medieval brick, probably of 17th/18th century date. The assemblage is of no significance or potential.

Glass

- 8.1.3 Three pieces of glass were recovered from two contexts (1002) and (2001), two of these fragments were of green bottle glass of post-medieval date, the other was a piece of modern window glass. The assemblage is of very limited significance and potential.

Flint

- 8.1.4 A single piece of burnt flint was recovered from context (1002), it shows no signs of working and is of no significance or potential.

Animal Bone

- 8.1.5 Thirty four pieces of animal bone were recovered from three contexts (1002), (2001) and (2002). The majority of these came from a partially complete sheep skeleton found in deposit (2002). The remaining animal bone was of sheep size. Given the small size of the assemblage it is of limited significance and potential.

Metalwork

- 8.1.6 Two metal finds were retrieved from the site, a post-medieval belt buckle from context (2001) and an amorphous iron object from context (1002). These items are of very limited significance and potential.

Environmental Remains

- 8.1.7 Samples were taken as part of the geoarchaeological works. The pollen assessment found that above 1.04m OD samples included grass, creeping buttercup, dandelion and sedge family; below

this level little pollen was recorded and what there was consisted of pine, birch, willow and hazel. This assemblage is suggestive of a more open environment above 1.04m with limited vegetation below this height.

- 8.1.8 One bulk sample was extracted towards the base of borehole <BH6> for radiocarbon dating. No datable macrofossils (seeds/wood) were present and thus a bulk sample containing organic material was extracted for radiocarbon dating. The sample was submitted for radiocarbon dating to the Scottish Universities Environmental Research Centre (SUERC) (Appendix D). The humin fraction of the sample at 0.58 and 0.66m OD has been radiocarbon dated to 8036-7874 cal yr BP. The sediment is thus Early Holocene in age, dating to around the time of the Boreal-Atlantic transition and the Middle Mesolithic cultural period (Appendix C).
- 8.1.9 The assemblage as a whole is indicative of an open environment, especially after the middle Mesolithic 8036-7874 cal BP; the area also seems to have become significantly wetter after this time.
- 8.1.10 The results of the environmental archaeological assessment have revealed that archaeobotanical and zooarchaeological remains are poorly preserved in the sedimentary sequence from borehole <BH6>. Further environmental archaeological analysis is therefore not recommended.

9. Significance of the Data

9.1 Summary of Results

- 9.1.1 No archaeological features were recorded on the site. Scatters of Roman pottery were retrieved from the Main Site, as well as a single sherd of Iron Age pottery, the remaining datable finds were all of post-medieval or modern date. No features or finds were observed on the Cooling Marshes site.
- 9.1.2 The geoarchaeological boreholes show that the land was likely to have been relatively open and subject to frequent flooding events, which began during the Mesolithic period and continued into the modern period.

9.2 Discussion of Significance

- 9.2.1 The on site groundworks did not generally extend to the required depth to reveal any archaeological features of significant age. The exception to this was in the Main Site where natural deposits were revealed at relatively shallow depths; however no archaeological features were encountered, although Roman and Iron Age pottery was found in the subsoil.
- 9.2.2 The site appears to have been used as seasonal pasture during drier periods before successive flooding events rendered much of the site too marshy to be useful. A single possible land surface was identified in the South Field area; however no evidence for settlement activity was noted.
- 9.2.3 The geoarchaeological evidence suggests that the site became more open and wetter around 8036-7874 cal BP, probably due to climatic changes. This change resulted in the deposition of the alluvial clays seen across much of the site.
- 9.2.4 The results are of local significance.

10. Review of Research Aims

10.1 Realisation of Research Aims

10.1.1 *Are there any Roman burials/cremations on the Site, and if so are they isolated burials or part of a cemetery?*

No Roman cremations or burials were observed on the three sites, though groundworks across much of the site did not extend deep enough to definitively prove the absence of such evidence.

10.1.2 *Is there any evidence for Roman industrial or settlement activity?*

The residual domestic Roman pottery found within the subsoil is the only evidence of Roman activity across the sites and while domestic pottery might suggest the presence of a nearby settlement, no other finds or features were revealed in support of this.

10.1.3 *Is there any evidence for agricultural remains from the medieval or post-medieval periods?*

No features or finds of medieval date were recorded on the site.

11. Summary of Further Work

11.1 Publication

11.1.1 No further analysis or formal publication is recommended. A short summary report will be submitted to the *Archaeologia Cantiana* journal and publication of the site data will also be made through the Archaeological Data Service OASIS form (Appendix E).

11.2 Archive Preparation

11.2.1 All retained artefacts will be cleaned, conserved and packaged in accordance with the requirements and guidelines of the United Kingdom Institute for Conservation's *Conservation Guidelines No. 2*, the Council for British Archaeology's *First Aid for Finds* (Second Edition, 1987) and the Institute of Field Archaeologist's *Guidelines for Finds Work* (1992). Small finds will be boxed separately from the bulk finds. Plans will be presented on hanging strips to fit the appropriate Museum storage systems.

11.2.2 A full archive will be prepared to standards outlined in *Management of Archaeological Projects: 2* (English Heritage 1991). The site archive will be presented to the appropriate museum in accordance with their requirements for conservation and storage and subject to the guidelines and requirements of MAP 2, as soon as is practicable, and within six months of completion of the fieldwork.

11.2.3 Agreement with the landowner will be sought for deposition of the finds and paper archive. Arrangements for the finds to be viewed by the landowner will be made if he/she wishes.

11.2.4 The archive, comprising of written, drawn, photographic and electronic media will be fully catalogued, indexed, cross referenced and checked for archival consistency.

12. Bibliography

English Heritage (1991). *Management of Archaeological Projects*

English Heritage (2002). *Environmental Archaeology: A guide to the theory and Practice of Methods, from sampling and recovery to post-excavation.*

Institute for Archaeologists (2008). *Standard and Guidance for Archaeological Excavations*

Institute for Archaeologists (2009). *Code of Conduct*.

Kent County Council (2006). *Manual of Specifications: Mitigation – Strip, Map and Sample Requirements*

Medway Council (2003). *Medway Local Plan*

MoLA (2008). *Stoke Level Crossing, County of Kent. Archaeological Desk-Based Assessment*

MoLA (2010). *Stoke Level Crossing, Kent, ME3, County of Kent: A report on the geoarchaeological monitoring of geotechnical investigations*

MoLAS (1994). *The MoLAS Archaeological Site Manual*.

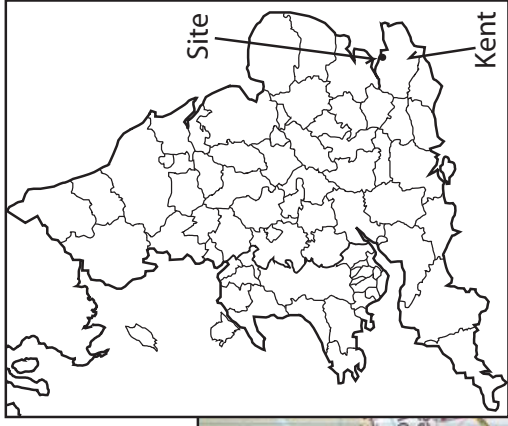
Mott MacDonald (2010a). *Medway Consultancy: IN68 Stoke Bridge. Environmental Statement Vols 1-2*.

Mott MacDonald (2010b). *A228 Stoke Bridge – Main Site and South Field; Archaeological Written Scheme of Investigation*.

Mott MacDonald (2010c). *A228 Stoke Bridge – Cooling Site; Archaeological Written Scheme of Investigation*.

STOKE BRIDGE, MAIN SITE, SOUTH FIELD AND COOLING MARSHES, KENT; AN ARCHAEOLOGICAL POST EXCAVATION ASSESSMENT REPORT

Approximate Site Location Within England & Wales

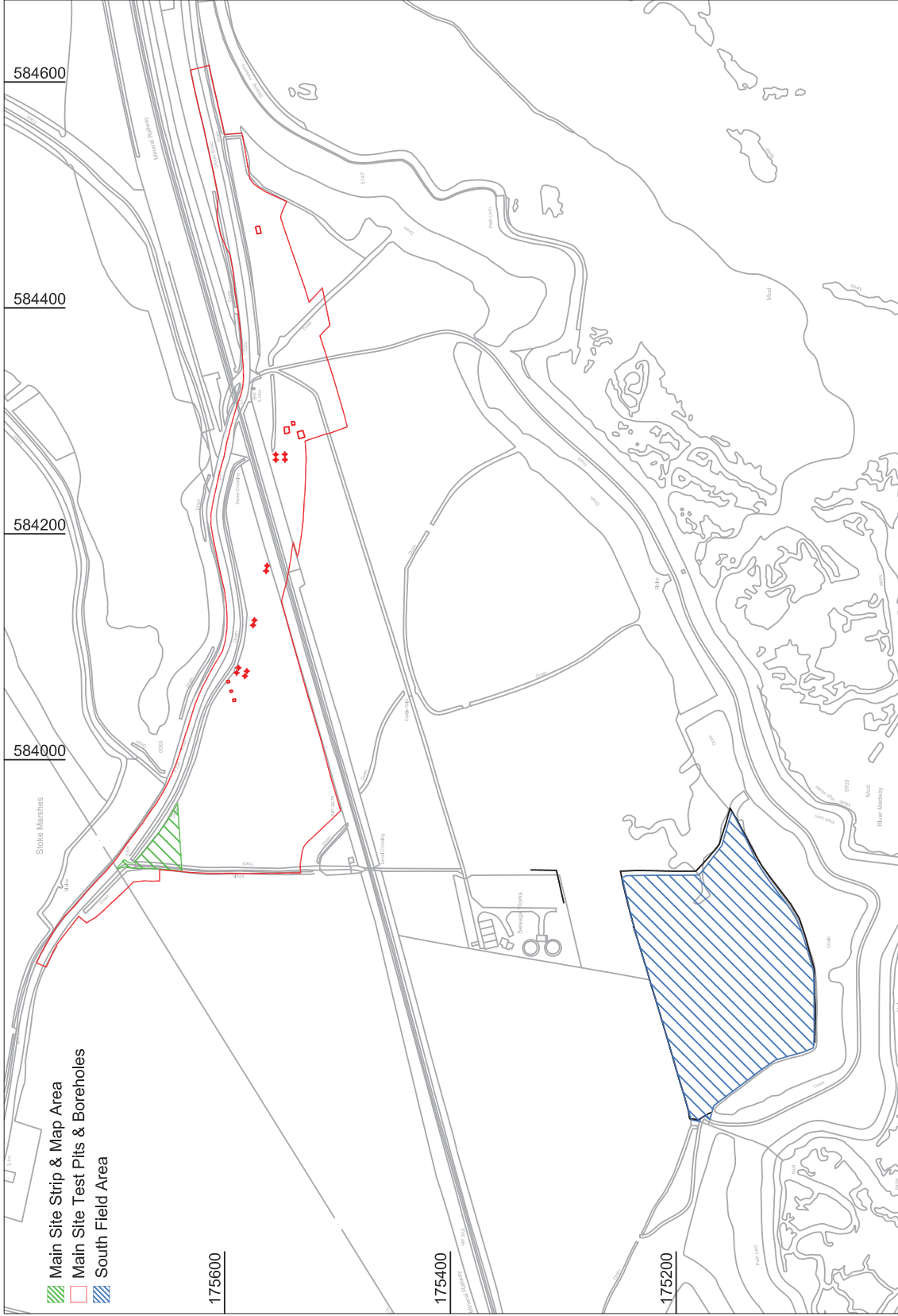
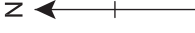


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Figure 1: Site Locations

STOKE BRIDGE, MAIN SITE, SOUTH FIELD AND COOLING MARSHES, KENT; AN ARCHAEOLOGICAL POST EXCAVATION ASSESSMENT REPORT



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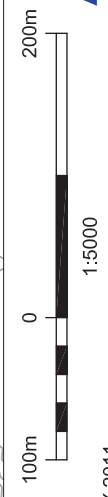


Figure 2: Detailed Location Plan; Main Site and South Field © AOC ARCHAEOLOGY GROUP - FEBRUARY 2011

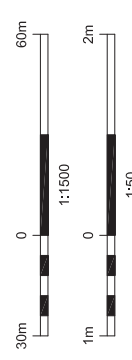
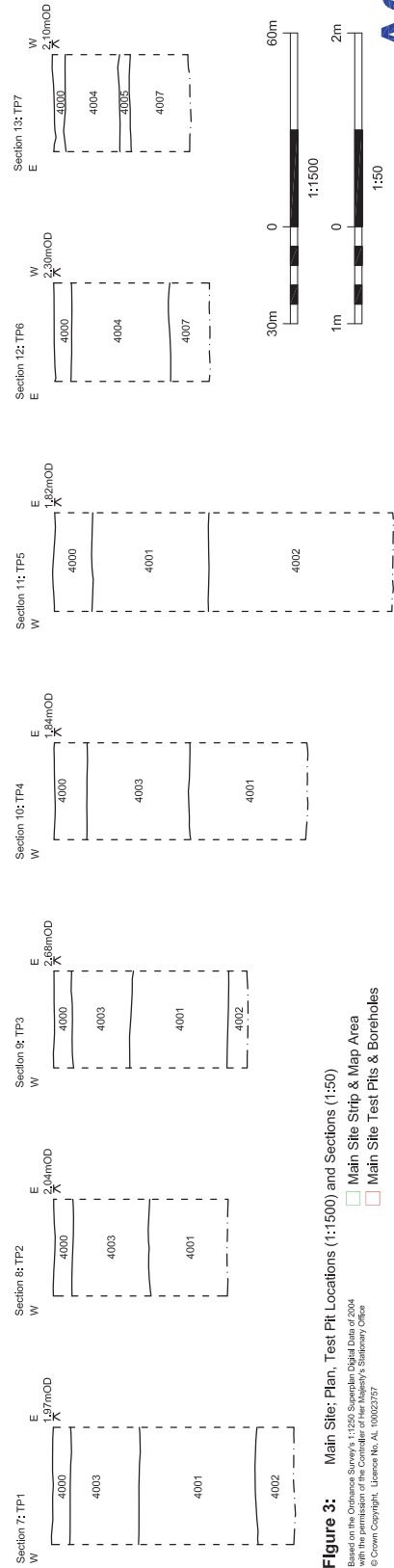
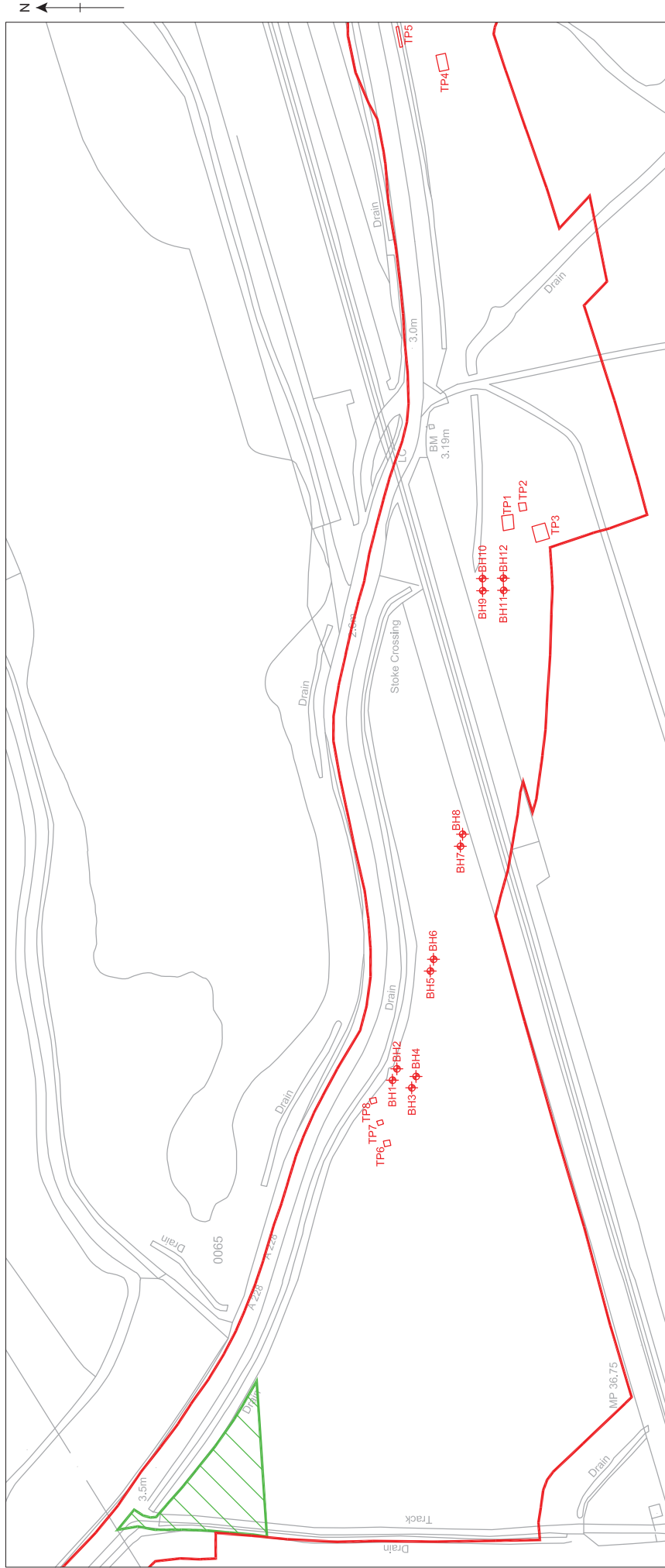


Figure 3: Main Site: Plan, Test Pit Locations (1:1500) and Sections (1:50)

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█ Main Site Strip & Map Area
█ Main Site Test Pits & Boreholes



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Figure 4: South Field Site; Plan, Ditch Locations (1:1500) and Sections (1:50)

STOKE BRIDGE, MAIN SITE, SOUTH FIELD AND COOLING MARSHES, KENT; AN ARCHAEOLOGICAL POST EXCAVATION ASSESSMENT REPORT



Figure 5: Cooling Marshes Site; Plan of Scrape Locations

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Appendices

Appendix A Context Register

Context	Description	Length	Width	Thickness
1001	Topsoil	60.00m	50.00m	0.20m
1002	Subsoil	60.00m	50.00m	0.40m
1003	Subsoil	60.00m	50.00m	NFE
2001	Topsoil	210.00m	140.00m	0.20m
2002	Subsoil	210.00m	140.00m	0.40m
2003	Alluvium	210.00m	140.00m	1.00m
2004	Alluvium	210.00m	140.00m	0.65m
2005	Alluvium	210.00m	140.00m	0.10m
2006	Land Surface?	210.00m	140.00m	NFE
2007	Alluvium	210.00m	140.00m	1.00m
3001	Topsoil	170.00m	160.00m	0.25m
3002	Subsoil	170.00m	160.00m	0.15m
3003	Alluvium	170.00m	160.00m	NFE
4000	Topsoil	3.00m	3.00m	0.40m
4001	Alluvium	3.00m	3.00m	1.40m
4002	Alluvium	3.00m	3.00m	0.50m
4003	Made Ground	3.00m	3.00m	0.70m
4004	Made Ground	3.00m	3.00m	1.20m
4005	Made Ground	3.00m	3.00m	0.15m
4006	Subsoil	2.00m	2.00m	0.66m
4007	Natural	2.00m	2.00m	NFE

(NFE = No further excavation)

Appendix B - Finds

Stoke Crossing Finds Assessment

Site Code SKB 10

By *Les Capon*

Introduction

The finds assemblage comprises pottery, animal bone, glass and building material. The majority of the assemblage is of 19th/20th century date, although there are residual, earlier finds.

Pottery

The pottery assemblage comprises 44 sherds from three contexts and one unstratified piece. The earliest piece is an unstratified sherd of flint-tempered pottery that probably dates from the Iron Age. Roman pottery is present in Context 1002, among pottery of a later date, and is clearly residual. The Roman sherds are 7 fine wares from jars, although there are two coarser sherds.

The bulk of the assemblage (35 sherds) is of late 19th century or early 20th century date, and includes pieces of English porcelain tablewares, and stoneware jars (contexts 1001, 1002 and 2001). There is one sherd from a redware bowl which may be of 18th century date. Of local interest are two joining sherds from a large stoneware bottle with the stamp ...OBE..., SHIP INN, STOKE.

Bone

Three contexts produced animal bone, (1002) and (2001) both had one bone each, while 32 semi-articulated bones from context (2002) represent the partial skeleton of a sheep, with limbs, vertebrae and pelvis fragments present.

Glass

Glass on the site was represented by one piece of modern window glass (context 2001) and two pieces of green bottle glass (contexts 1002 and 2001).

Building Materials

The building materials from the work are of post-medieval date. Pegtiles were collected from two contexts (1002 and 2001), with one fragment of brick from (2001). These probably date from 1600-1800.

Other

One piece of burnt flint was collected from context (1002).

Two metal items were collected, a post-medieval copper alloy belt buckle (1002) and an indeterminate piece of heavily corroded iron (2001)

Recommendations and Conclusions

No further work is recommended on the assemblage at present. However, if further works take place, the Roman and prehistoric pottery should be further analysed. It is recommended that the post-medieval pottery and the building material be discarded.

Appendix C - Environmental Assessment

A228 STOKE BRIDGE, STOKE, ISLE OF GRAIN, KENT: ENVIRONMENTAL ARCHAEOLOGICAL ASSESSMENT

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INTRODUCTION

This report summarises the findings arising out of the environmental archaeological assessment undertaken by Quaternary Scientific (University of Reading) in connection with the proposed development at A228 Stoke Bridge, Stoke, Isle of Grain, Kent (National Grid Reference: TQ 843 755; Figure 1). The investigation relates to the construction of a new bridge carrying the A228 over the railway at a point about 1.0km to the east of the village of Lower Stoke in the Hoo peninsula on the North Kent coast. The site lies on the low ground that separates the higher ground of the Hoo peninsula to the west from the Isle of Grain to the east. This area of low ground forms the catchment of the Yantlet Creek that drains northward from a source near the southern shore of the Hoo peninsula in Stoke Marshes. The site is on the southern edge of the Marshes, about 0.2km from the sea-bank that separates the dry land of the Hoo peninsula from the complex of islets and mud and sand flats that form the north shore of the Medway estuary. Mapping by the British Geological Survey (BGS) (1:50,000 Sheet 272 Chatham, 1977) shows the site underlain by Alluvium overlying London Clay. The higher ground to the west and to the east in the Isle of Grain is occupied by River Gravel underlying low terraces (1st and 2nd Terraces) of the River Medway. Geotechnical boreholes (MoLA, 2010) recorded the London Clay at -11.0m OD overlain by 9 to 10m of sand and gravel and 1.5 to 2.5m of alluvium. At the site, the natural ground surface is at a level close to 3.0m OD, but in the eastern half of the site up to 1.0m of Made Ground is present, raising the ground surface to between 3.5m and 4.0m OD.

The aim of the borehole investigations at Stoke Bridge was to produce a basic model of the sub-surface stratigraphy across the site, and following the results of the borehole survey, a fuller investigation of the local and regional environments of the alluvial sediments was recommended to: (1) identify evidence of change or continuity through time; (2) establish whether any significant spatial variability exists across the site, and (3) detect evidence of human activity. An assessment of one core was recommended in the first instance, from borehole <BH6>, as it contained significant alluvial and organic-rich horizons.

The environmental archaeological assessment of this core was carried out in order to evaluate the potential of the sedimentary sequence for reconstructing the environmental history of the site and its environs. In order to achieve this aim, the environmental archaeological assessment consisted of the following techniques:

1. Recording the lithostratigraphy of the boreholes to provide a preliminary reconstruction of the sedimentary history of the site
2. Carrying out organic matter content determinations to enhance the results of the sedimentary descriptions
3. Radiocarbon dating of a bulk sample to provide a provisional geochronological framework for the natural stratigraphic sequence
4. Assessment of the preservation and concentration of pollen grains and spores to provide a preliminary reconstruction of the vegetation history, and to detect evidence for human activities e.g. woodland clearance and cultivation
5. Assessment of the preservation and concentration of diatom frustules
6. Assessment of the preservation and concentration of macroscopic plant, insect and Mollusca remains from small bulk samples to provide a preliminary reconstruction of the vegetation history and general environmental context of the site.

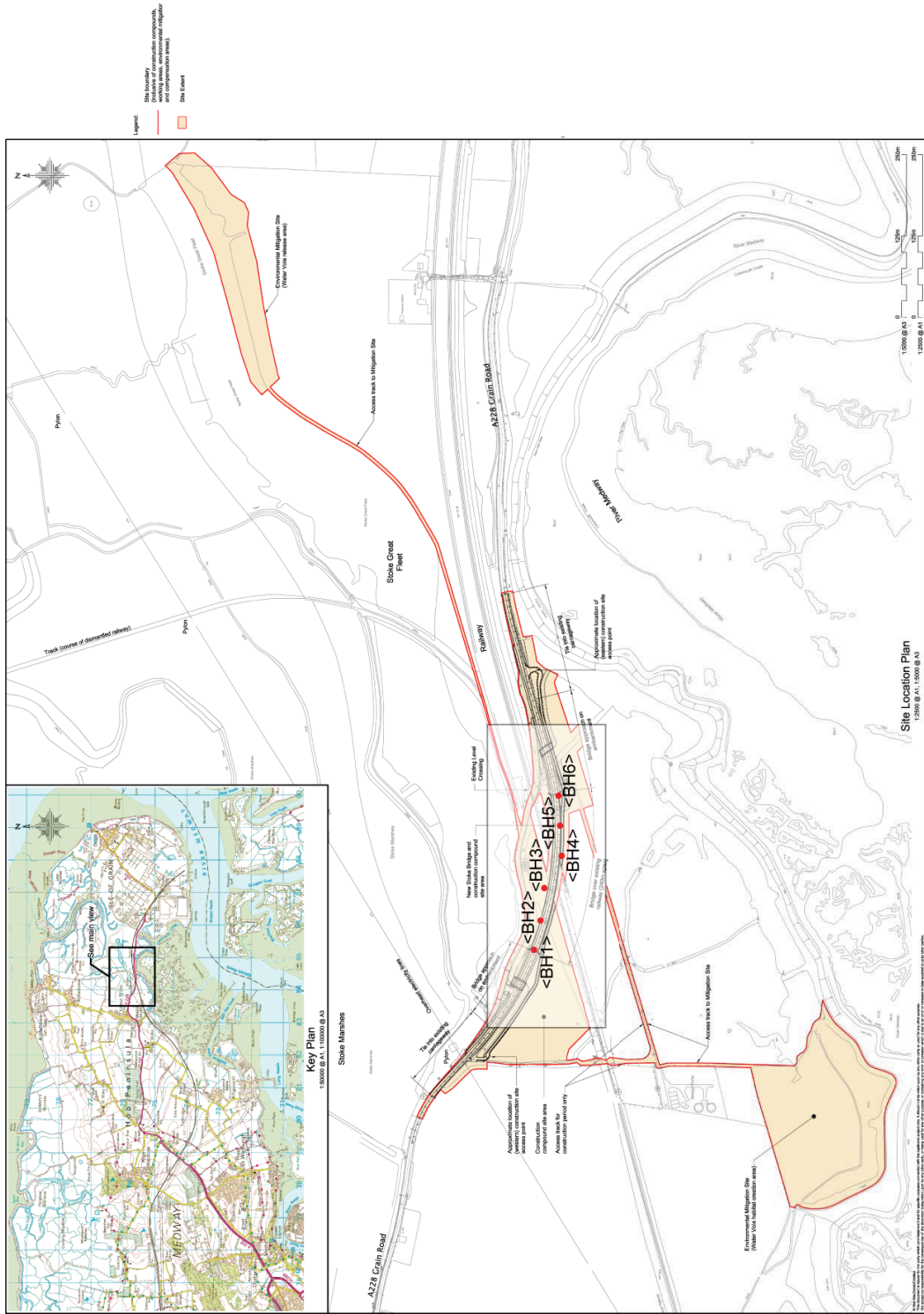


Figure 1: Borehole locations at A228 Stoke Bridge, Stoke, Isle of Grain, Kent (adapted from Williams, 2010)

METHODS

Lithostratigraphic descriptions

Six boreholes numbered <BH1> to <BH6> from west to east were put down immediately adjacent to the planned position of the six bridge piers, forming a transect at approximately equal intervals over a distance of ca .240m.

The lithostratigraphy of the six boreholes was described in the laboratory using standard procedures for recording unconsolidated sediment and organic sediments, noting the physical properties (colour), composition (gravel, sand, clay, silt and organic matter) and inclusions (e.g. artefacts) (Troels-Smith, 1955). The procedure involved: (1) cleaning the samples with a spatula or scalpel blade and distilled water to remove surface contaminants; (2) recording the physical properties, most notably colour using a Munsell Soil Colour Chart; (3) recording the composition; gravel (*Grana glareosa*; Gg), fine sand (*Grana arenosa*; Ga), silt (*Argilla granosa*; Ag) and clay (*Argilla steatoides*); (4) recording the degree of peat humification and (5) recording the unit boundaries e.g. sharp or diffuse. The results are illustrated in Figure 2, with the descriptions presented in Tables 1 to 6.

Organic matter determinations

Thirty seven sub-samples from borehole <BH6> were taken for determination of the organic matter content (Table 7; Figure 2). This analysis is important as it can identify increases in organic matter possibly associated with more terrestrial conditions. The organic matter content was determined by standard procedures involving: (1) drying the sub-sample at 110⁰C for 12 hours to remove excess moisture; (2) placing the sub-sample in a muffle furnace at 550⁰C for 2 hours to remove organic matter (thermal oxidation), and (3) re-weighing the sub-sample obtain the 'loss-on-ignition' value (see Bengtsson and Enell, 1986).

Radiocarbon dating

One bulk sample was extracted towards the base of borehole <BH6> for radiocarbon dating. No datable macrofossils (seeds/wood) were present and thus a bulk sample containing organic material was extracted for radiocarbon dating. The sample was submitted for radiocarbon dating to the Scottish Universities Environmental Research Centre (SUERC). The results have been calibrated using OxCal v4.0.1 Bronk Ramsey (1995, 2001 and 2007) and IntCal04 atmospheric curve (Reimer et al., 2004). The results are displayed in Table 8.

Pollen assessment

Twelve sub-samples from borehole <BH6> were extracted for an assessment of pollen content. The pollen was extracted as follows: (1) sampling a standard volume of sediment (1ml); (2) adding two tablets of the exotic clubmoss *Lycopodium clavatum* to provide a measure of pollen concentration in each sample; (3) deflocculation of the sample in 1% Sodium pyrophosphate; (4) sieving of the sample to remove coarse mineral and organic fractions (>125 μ); (5) acetolysis; (6) removal of finer

minerogenic fraction using Sodium polytungstate (specific gravity of 2.0g/cm³); (7) mounting of the sample in glycerol jelly. Each stage of the procedure was preceded and followed by thorough sample cleaning in filtered distilled water. Quality control is maintained by periodic checking of residues, and assembling sample batches from various depths to test for systematic laboratory effects. Pollen grains and spores were identified using the University of Reading pollen type collection and the following sources of keys and photographs: Moore *et al.* (1991); Reille (1992). The assessment procedure consisted of scanning the prepared slides, and recording the concentration and preservation of pollen grains and spores, and the principal taxa on four transects (10% of the slide) (Table 9).

Diatom assessment

Twelve sub-samples from borehole <BH6> were extracted for the assessment of diatoms. The diatom extraction involved the following procedures (Battarbee *et al.*, 2001):

1. Treatment of the sub-sample (0.2g) with Hydrogen peroxide (30%) to remove organic material and Hydrochloric acid (50%) to remove remaining carbonates
2. Centrifuging the sub-sample at 1200 for 5 minutes and washing with distilled water (4 washes)
3. Removal of clay from the sub-samples in the last wash by adding a few drops of Ammonia (1%)
4. Two slides prepared, each of a different concentration of the cleaned solution, were fixed in mounting medium of suitable refractive index for diatoms (Naphrax)

Duplicate slides each having two coverslips were made from each sample and fixed in Naphrax for diatom microscopy. The coverslip with the most suitable concentration of the sample preparation was selected for diatom evaluation. A large area of this coverslip was scanned for diatoms at magnifications of x400 and x1000 under phase contrast illumination using a Leica microscope.

The results are displayed in Table 10.

Macrofossil assessment

Nine small bulk samples from borehole <BH6> were extracted for the recovery of macrofossil remains including waterlogged plant macrofossils, waterlogged wood, insects and Mollusca. The extraction process involved the following procedures: (1) removing a sample up to 10cm in thickness; (2) measuring the sample volume by water displacement, and (3) processing the sample by wet sieving using 300µm and 1mm mesh sizes. Each sample was scanned under a stereozoom microscope at x7-45 magnifications, and sorted into the different macrofossil classes. The concentration and preservation of remains was estimated for each class of macrofossil (Table 11).

Preliminary identifications of the archaeobotanical remains (waterlogged plant macrofossils and wood), have been made using modern comparative material and reference atlases (Cappers *et al.* 2006, Hather 2000, Schweingruber 1990, Schoch *et al.* 2004). Nomenclature used follows Stace (2005). The quantities of waterlogged seeds and wood were recorded for each sample, with identifications of the main taxa (Tables 12 and 13). The concentration and state of preservation of the zooarchaeological remains (insects and Mollusca) were made under a low powered stereo-microscope and each noted in Table 11.

RESULTS AND INTERPRETATION OF THE LITHOSTRATIGRAPHIC DESCRIPTIONS AND ORGANIC MATTER CONTENT DETERMINATIONS.

Boreholes <BH1>, <BH2> and <BH3> at the western end of the transect appear to be put down from the surface of a natural soil at 3.0m OD into yellowish brown alluvial sediments. The upper part of the sediment sequence in all three boreholes is a soil A horizon, clayey in texture with modern root material throughout and dark brown in colour. It passes down into a greyish brown B horizon with reddish brown mottling. At about 1.0m bgs (2.0m OD) in all three boreholes there is a transition to a yellowish brown parent material with sand and/or gravel becoming increasingly common downward. Boreholes <BH1> and <BH2> terminate downward in sandy gravel, respectively at 3.0m (0.0m OD) and 2.0m bgs (1.0m OD). Borehole <BH3> penetrated to 6.0m bgs (-3.0m OD), passing through a sequence of sands, clays, clayey sands and sandy clays, slightly pebbly in places and becoming more olive in colour downward. No organic sediments were recognised in any of these boreholes.

The sediment sequences at the eastern end of the transect, in boreholes <BH4>, <BH5> and <BH6> are all capped by made ground which overlies mottled silty clay, possibly the lower part of a truncated soil. In all three boreholes, the mottled horizon passes down into dark or very dark grey silts and clays. In borehole <BH4> *in situ* vertical roots penetrate these dark silts between 3.43m and 4.00m bgs (0.02 to -0.55m OD) and in boreholes <BH5> and <BH6> visible detrital plant remains are present at about the same level, (2.69-3.87m bgs; 0.81m to -0.37m OD). Mollusc remains are also present in borehole <BH5> at this level. In all three boreholes these dark silts and clays rest on slightly pebbly olive coloured silty or clayey sands. In borehole <BH6> *in situ* vertical roots penetrate downward from the dark coloured silts and clays into the underlying pebbly sand.

There is an obvious contrast between the sediment sequences at the western and eastern ends of the transect. At the western end, the contact between fine-grained silty and clayey alluvial sediments and the underlying sand and gravel is at c.1.5-2.0m OD, some 2.0m higher than it is at the eastern end of the transect. It seems likely that the organic remains and rooting horizons seen in boreholes <BH4>, <BH5> and <BH6> at levels close to OD represent deposition and plant growth in a shallow, low lying depression, possibly a channel, cut into the sandier, inorganic sediments that are represented in boreholes <BH1>, <BH2> and <BH3>. The organic sediments are almost certainly of Holocene age

and were probably deposited in a tidal creek; the underlying sand and gravel is unlikely to be later than Late Devensian and probably represents deposition by a branch of the River Medway.

Quantification of the organic matter content by Loss-on-Ignition allowed further detail to be added to the lithostratigraphic descriptions (Table 7). The results revealed that organic matter values were consistently low through the borehole sequence (generally <10%). This analysis demonstrated that the slightly organic unit identified between 0.50 to 0.23m OD contained only ca. 5% organic matter. Peaks in organic matter content between 15 and 20% in the upper clayey units above 1.80m OD in borehole <BH6> are probably indicative of modern root material or detrital plant material within this unit.

Table 1: Lithostratigraphic description of borehole <BH1>, A228 Stoke Bridge, Stoke, Isle of Grain, Kent

Depth (m OD)	Depth (m bgs)	Composition
3.00 to 2.70	0.00 to 0.30	10YR 3/4; As3 Sh1; dark yellowish brown organic clay topsoil with flint clasts and modern roots. Diffuse contact in to:
2.70 to 2.00	0.30 to 1.00	10YR 5/2; As4 Ag+; greyish brown silty clay with iron staining and some fine modern roots. Some mollusc fragments.
2.00 to 1.00	1.00 to 2.00	10YR 5/6; Gg2 As2; yellowish brown gravel and clay. Flint clasts 20-50mm.
1.00 to 0.00	2.00 to 3.00	10YR 5/6; Gg2 Ga2 As+; yellowish brown gravel and sand with traces of clay. Some clayey lenses.

Table 2: Lithostratigraphic description of borehole <BH2>, A228 Stoke Bridge, Stoke, Isle of Grain, Kent

Depth (m OD)	Depth (m bgs)	Composition
3.00 to 2.95	0.00 to 0.05	10YR 2/2; As4 Sh+; very dark brown clay topsoil with modern roots. Diffuse contact in to:
2.95 to 2.58	0.05 to 0.42	10YR 3/3; As4; dark brown clay with modern roots. Diffuse contact in to:
2.58 to 1.75	0.42 to 1.25	10YR 4/2; As4; dark greyish brown clay with iron staining. Diffuse contact in to:
1.75 to 1.50	1.25 to 1.50	10YR 5/3; Ga2 As2 Gg+; brown sand and clay with occasional flint clasts up to 40mm. Diffuse contact in to:
1.50 to 1.00	1.50 to 2.00	10YR 3/4; Gg2 Ga1 As1; dark yellowish brown sandy clayey gravel.

Table 3: Lithostratigraphic description of borehole <BH3>, A228 Stoke Bridge, Stoke, Isle of Grain, Kent

Depth (m OD)	Depth (m bgs)	Composition
3.00 to 2.60	0.00 to 0.40	10YR 3/3; As4; dark brown clay topsoil with modern roots throughout. Diffuse contact in to:
2.60 to 2.00	0.40 to 1.00	10YR 4/2; As3 Ag1; dark greyish brown silty clay with iron staining in root channels/(worm holes?) throughout.
2.00 to 1.83	1.00 to 1.17	Gley 1 4/10Y; As3 Ag1; dark greenish grey silty clay with iron staining in root channels/(worm holes?) throughout. Diffuse contact in to:
1.83 to 1.60	1.17 to 1.40	10YR 4/4; Ga2 As2 Gg+; dark yellowish brown clay and sand

		with occasional gravel clasts and iron staining. Diffuse contact in to:
1.60 to 1.30	1.40 to 1.70	10YR 4/4; Ga3 As1 Gg+; dark yellowish brown clayey sand with occasional gravel clasts. Diffuse contact in to:
1.30 to 1.15	1.70 to 1.85	10YR 5/4; Ga2 As2 Gg+; yellowish brown clay and sand with occasional flint clasts up to 10mm. Diffuse contact in to:
1.15 to 1.00	1.85 to 2.00	10YR 5/4; As2 Ag1 Ga1; yellowish brown silty sandy clay.
1.00 to 0.73	2.00 to 2.27	2.5Y 5/4; As3 Ag1 Ga+ Gg+; light olive brown silty clay with traces of sand and occasional gravel clasts. Iron staining. Sharp contact in to:
0.73 to 0.70	2.27 to 2.30	10YR 4/3; Ga4 As+; brown sand with traces of clay. Sharp contact in to:
0.70 to 0.12	2.30 to 2.88	2.5Y 5/4; As3 Ag1 Ga+ Gg+; light olive brown silty clay with traces of sand and occasional flint clasts up to 40mm. Diffuse contact in to:
0.12 to 0.00	2.88 to 3.00	2.5Y 4/3; As3 Ga1 Ag+; olive brown sandy clay with traces of silt.
0.00 to -0.63	3.00 to 3.63	5Y 4/3; As2 Ga1 Ag1 Gg+; olive sandy silty clay with occasional gravel clasts. Diffuse contact in to:
-0.63 to -0.93	3.63 to 3.93	5Y 4/3; Ga4 As+ Gg+; olive sand with traces of clay and occasional gravel clasts. Sharp contact in to:
-0.93 to -1.00	3.93 to 4.00	5Y 4/3; Ga2 As2; olive sand and clay.
-1.00 to -2.00	4.00 to 5.00	2.5Y 5/6; Ga2 As2; olive sand and clay. Some horizontal layering of more clayey and more sandy units; majority massive.
-2.00 to -2.20	5.00 to 5.20	2.5Y 5/6; Ga3 As1; light olive brown clayey sand. Massive. Sharp contact in to:
-2.20 to -2.30	5.20 to 5.30	2.5Y 5/6; Ga4 As+; light olive brown coarse sand with traces of clay. Some bedding. Sharp contact in to:
-2.30 to -3.00	5.30 to 6.00	2.5Y 5/6; Ga2 As2; light olive brown clay and sand with some horizontal layering of more clayey units.

Table 4: Lithostratigraphic description of borehole <BH4>, A228 Stoke Bridge, Stoke, Isle of Grain, Kent

Depth (m OD)	Depth (m bgs)	Composition
3.45 to 2.17	0.00 to 1.28	As4 Sh+; clay topsoil above made ground with brick, pot mortar, flint, gravel and glass. Sharp contact in to:
2.17 to 1.45	1.28 to 2.00	10YR 5/2; As4 Ag+; greyish brown clay with a trace of silt. Iron staining throughout.
1.45 to 0.88	2.00 to 2.57	Fall in from made ground above
0.88 to 0.68	2.57 to 2.77	Gley 1 4/10Y; Ag3 As1; dark greenish grey clayey silt. Diffuse contact in to:
0.68 to 0.54	2.77 to 2.91	10YR 4/1; Ag3 As1 Sh+; dark grey clayey silt with vertical root channels throughout. Sharp contact in to:
0.54 to 0.45	2.91 to 3.00	10YR 4/2; Ga2 As2 Gg+; dark greyish brown sand and clay with occasional gravel clasts.
0.45 to 0.02	3.00 to 3.43	Fall in from made ground above
0.02 to -0.22	3.43 to 3.67	10YR 5/3; As3 Ag1; brown silty clay with iron staining in vertical worm holes. Diffuse contact in to:
-0.22 to -0.55	3.67 to 4.00	10YR 4/1; Ag3 As1; dark grey clayey silt with iron staining in

		vertical worm holes.
-0.55 to -0.75	4.00 to 4.20	Fall in from made ground above
-0.75 to -0.87	4.20 to 4.32	2.5Y 4/2; Ga2 As2; dark greyish brown clay and sand. Massive. Diffuse contact in to:
-0.87 to -1.30	4.32 to 4.75	2.5Y 5/3; As3 Ga1 Gg+; light olive brown sandy clay with occasional gravel clasts. Diffuse contact in to:
-1.30 to -1.55	4.75 to 5.00	5Y 4/3; Gg2 Ga1 As1; olive clayey sandy gravel. Flint clasts 5-6mm, rounded.

Table 5: Lithostratigraphic description of borehole <BH5>, A228 Stoke Bridge, Stoke, Isle of Grain, Kent

Depth (m OD)	Depth (m bgs)	Composition
3.50 to 2.98	0.00 to 0.52	Made ground including brick, slag, mortar, modern roots (clayey topsoil to 0.30). Diffuse contact in to:
2.98 to 2.50	0.52 to 1.00	10YR 5/3; As4 Ag+; brown clay with traces of silt. Iron staining throughout
2.50 to 1.80	1.00 to 1.70	10YR 5/3; As3 Ag1; brown silty clay with some iron staining. Diffuse contact in to:
1.80 to 1.50	1.70 to 2.00	10YR 4/2 turning to 10YR 3/1; Ag3 As1 dark greyish brown to very dark grey clayey silt.
1.50 to 1.38	2.00 to 2.12	Fall in from made ground above.
1.38 to 0.50	2.12 to 3.00	10YR 3/1; Ag3 As1 very dark grey clayey silt.
0.50 to 0.40	3.00 to 3.10	Fall in from made ground above.
0.40 to -0.12	3.10 to 3.62	10YR 3/1; Ag3 As1 Sh+; very dark grey clayey silt with traces of disintegrated organic material. Diffuse contact in to:
-0.12 to -0.37	3.62 to 3.87	10YR 3/1; Gg3 Ag1; very dark grey silty gravel with some mollusc shells. Diffuse contact in to:
-0.37 to -0.50	3.87 to 4.00	2.5Y 4/3; Ga2 As2; olive brown sand and clay.
-0.50 to -0.88	4.00 to 4.38	5Y 4/3; Ga2 Ag2; olive silt and sand. Diffuse contact in to:
-0.88 to -1.06	4.38 to 4.56	5Y 4/3; Ga2 Ag1 As1; olive silty clayey fine sand. Horizontal bedding incorporating calcareous material (marl?). Diffuse contact in to:
-1.06 to -1.39	4.56 to 4.89	5Y 4/4; Ga4 Ag+; olive coarse sand with traces of silt.

Table 6: Lithostratigraphic description of borehole <BH6>, A228 Stoke Bridge, Stoke, Isle of Grain, Kent

Depth (m OD)	Depth (m bgs)	Composition
3.50 to 2.85	0.00 to 0.65	Made ground with brick, slag, flint cobbles. Clayey topsoil with modern roots. Sharp contact in to:
2.85 to 2.73	0.65 to 0.77	10YR 5/6; As4; yellowish brown clay. Sharp contact in to:
2.73 to 2.50	0.77 to 1.00	10YR 5/6; As4; yellowish brown clay with some fine root material and mollusc fragments.
2.50 to 2.12	1.00 to 1.38	10YR 4/3; As4 Ag+; brown clay with traces of silt. Some iron staining. Sharp contact in to:
2.12 to 2.04	1.38 to 1.46	10YR 2/1; As3 Ag1 Sh+; black silty clay with traces of disintegrated organic material. Fragment of slag? Sharp contact in to:
2.04 to 1.91	1.46 to 1.59	10YR 4/3; As4 Ag+; brown clay with traces of silt. Sharp contact in to:
1.91 to 1.77	1.59 to 1.73	10YR 3/1; As3 Ag1 Sh+; very dark grey silty clay with traces of

		disintegrated organic material. Sharp contact in to:
1.77 to 1.74	1.73 to 1.76	10YR 3/1; Ag4; Modern? wood, slag and mortar in a very dark grey silt matrix. Sharp contact in to:
1.74 to 1.50	1.76 to 2.00	2.5Y 4/2; Ag2 As2; dark greyish brown clay and silt. Iron staining along root channels.
1.50 to 0.81	2.00 to 2.69	10YR 4/1; Ag3 As1; dark grey clayey silt. Some iron staining. Diffuse contact in to:
0.81 to 0.50	2.69 to 3.00	10YR 3/1; Ag3 As1 Sh+; very dark grey clayey silt with completely disintegrated organic material.
0.50 to 0.23	3.00 to 3.27	2.5Y 3/1; Ag2 As1 Sh1; very dark grey clayey silt with disintegrated organic material. Sharp contact in to:
0.23 to -0.50	3.27 to 4.00	2.5Y 4/3; Ga3 Ag1 Gg+; olive brown silty sand with occasional gravel clasts 30-35mm. Massive. Vertical root channels.

Table 7: Results of the organic matter determinations of borehole <BH6>, A228 Stoke Bridge, Stoke, Isle of Grain, Kent

Depth (m OD)		Organic matter (%)
From	To	
2.47	2.46	6.79
2.39	2.38	8.18
2.31	2.30	8.85
2.23	2.22	8.62
2.15	2.14	7.63
2.07	2.06	15.69
1.99	1.98	8.56
1.91	1.90	8.89
1.83	1.82	15.53
1.75	1.74	N/A
1.67	1.66	7.68
1.59	1.58	6.89
1.51	1.50	6.42
1.43	1.42	7.50
1.35	1.34	6.18
1.27	1.26	6.55
1.19	1.18	3.74
1.11	1.10	4.08
1.03	1.02	3.76
0.95	0.94	4.50
0.87	0.86	4.10
0.79	0.78	3.55
0.71	0.70	4.25
0.63	0.62	4.75
0.55	0.54	5.38
0.47	0.46	5.03
0.39	0.38	5.50

0.31	0.30	4.97
0.23	0.22	2.67
0.15	0.14	2.96
0.07	0.06	1.24
-0.01	-0.02	1.44
-0.09	-0.10	1.90
-0.17	-0.18	1.68
-0.25	-0.26	1.91

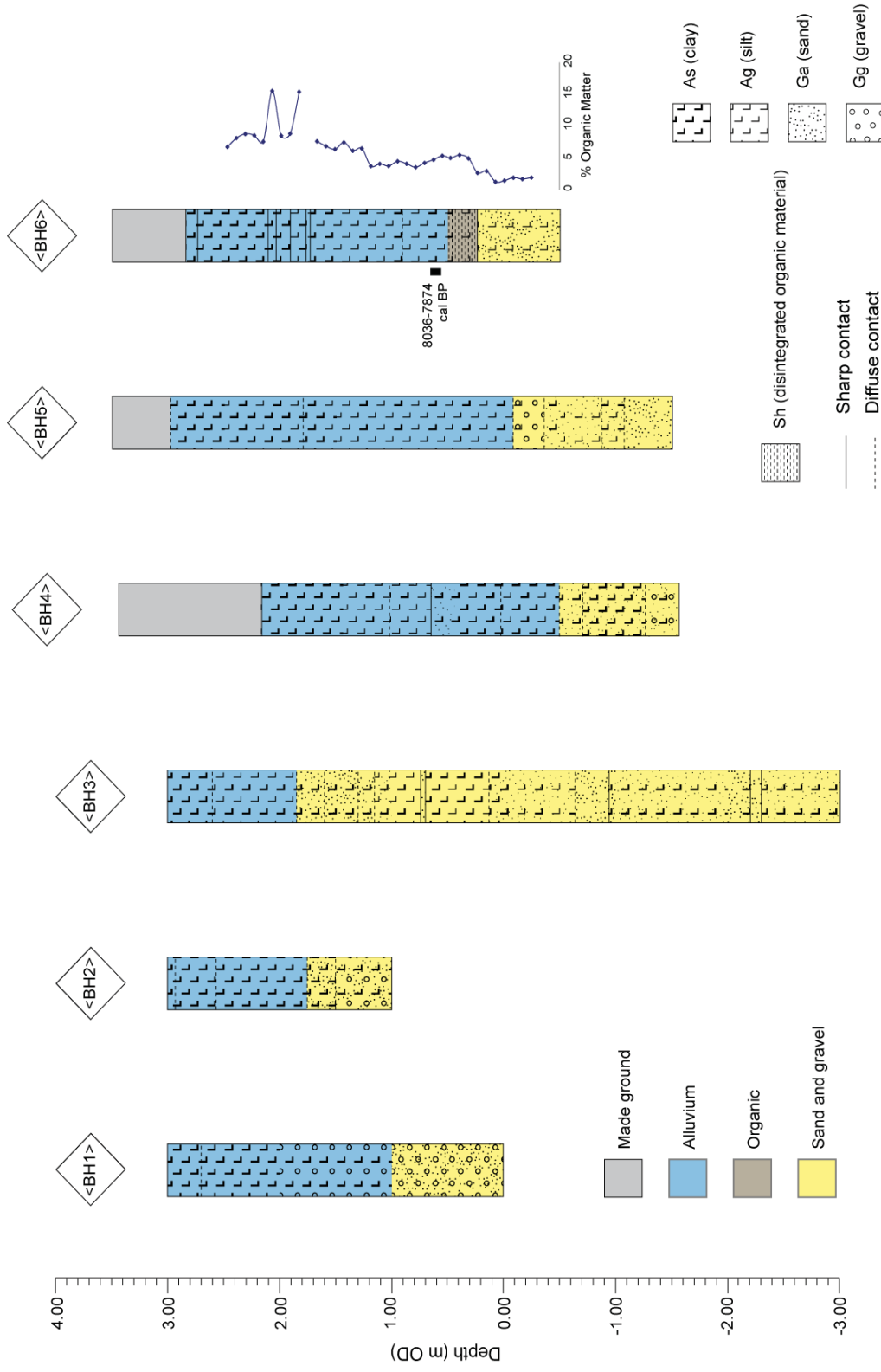


Figure 2: Results of the borehole <BH1> to <BH6> lithostratigraphic analysis, incorporating lithostratigraphic descriptions, radiocarbon date and organic matter content. A228 Stoke Bridge, Stoke, Isle of Grain, Kent

RESULTS AND INTERPRETATION OF THE HUMIC AND HUMIN ACID FRACTION DATING

No datable macrofossils (seeds/wood) were present in the borehole sequence and thus a bulk organic-rich sample had to instead be selected for radiocarbon dating. The results of the organic matter content and calcium carbonate determinations indicated that the organic silt between 0.58 and 0.66m OD was most suitable for radiocarbon dating (Figure 2).

Unfortunately insufficient sample was available for a radiometric date, and thus two AMS determinations had to be carried out on the single horizon; one on the humic acid (alkali-soluble fraction) and one on the humins (alkali-insoluble fraction). The radiocarbon laboratory was unable to extract enough humic acid from the sample to retrieve a date for this fraction; the humin fraction is therefore provided without a determination of the humic acid fraction. The humin fraction is likely to indicate the 'true age' if enough humins survive, and the level of discrepancy with the humic acids is available to provide the measure of how reliable the determination is (Ballantyne, pers comm.).

The humin fraction of the sample at 0.58 and 0.66m OD has been radiocarbon dated to 8036-7874 cal yr BP. The sediment is thus Early Holocene in age, dating to around the time of the Boreal-Atlantic transition and the Middle Mesolithic cultural period. It must be noted however that this date may be affected by detrital material that may have accumulated within the bulk sample, and thus must be treated with some caution.

Table 8: Results of the radiocarbon dating of borehole <BH6>, A228 Stoke Bridge, Stoke, Isle of Grain, Kent

Laboratory code / Method	Material and location	Depth (m OD)	Uncalibrated radiocarbon years before present (yr BP)	Calibrated age BC/AD (BP) (2-sigma, 95.4% probability)	δ13C (‰)
SUERC-32537 (GU-22942)	Humin (alkali insoluble) fraction of bulk organic sediment	0.66 to 0.58	7155±40	6086-5924 cal BC (8036-7874 cal BP)	-24.2

RESULTS AND INTERPRETATION OF THE POLLEN ASSESSMENT

Twelve sub-samples from borehole <BH6> were extracted for an assessment of pollen content.

The results of the pollen assessment indicate that pollen was preserved in low to moderate concentrations throughout the sequence, with two samples containing no pollen grains or spores (2.32 to 2.31 and 0.48 to 0.47m OD).

In general, the assemblages are dominated by herbaceous taxa including: Poaceae (grass family), Cyperaceae (sedge family), *Chenopodium* type (e.g. fat hen), *Aster* type (e.g. daisy), *Ranunculus* type (e.g. creeping buttercup) and *Taraxacum* (dandelion). Below 1.04m OD tree and shrub taxa were

limited, but included *Pinus* (pine), *Betula* (birch), *Salix* (willow) and *Corylus* type (e.g. hazel). Above 1.04m OD tree and shrub taxa were poorly represented, with only one occurrence of *Quercus* (oak). Micro-charcoal was present in low concentrations in all samples.

The assemblage is indicative of an open environment dominated by herbaceous vegetation, with possible evidence for a more open environment above 1.04m OD. Given the poor concentrations of pollen within the samples however this interpretation must be treated with caution. Definitive indicators of anthropogenic activity (e.g. cereals) were not noted during this assessment.

Table 9: Results of the pollen assessment of borehole <BH6>, A228 Stoke Bridge, Stoke, Isle of Grain, Kent

Depth (m OD)	Main pollen taxa		Common name	Number	Concentration 0 - 5	Preservation 0 - 5	Microcharcoal 0 - 5
	From	To					
2.32	-	-	-	-	0	-	1
2.00	<i>Chenopodium</i> type		e.g. fat hen	1	2	4	2
	Poaceae		grass family	2			
	<i>Corylus</i> type		e.g. hazel	1			
	cf. <i>Quercus</i>		cf. oak	1			
1.84	<i>Taraxacum</i>		dandelion	1	2	4	1
	Poaceae		grass family	5			
	Cyperaceae		sedge family	1			
1.68	Poaceae		grass family	2	1	3	2
	Cyperaceae		Sedge family	1			
	<i>Chenopodium</i> type		e.g. fat hen	1			
1.36	Poaceae		grass family	1	1	3	1
	<i>Chenopodium</i> type		e.g. fat hen	1			
1.04	<i>Chenopodium</i> type		e.g. fat hen	4	2	4	1
	<i>Salix</i>		willow	1			
	Poaceae		grass family	1			
0.72	<i>Pinus</i>		pine	1	1	2	1
	<i>Chenopodium</i> type		e.g. fat hen	1			
0.56	Poaceae		grass family	4	2	4	1
	Cyperaceae		sedge family	2			
	<i>Corylus</i> type		e.g. hazel	1			
	<i>Pinus</i>		pine	1			
0.48	-		-	-	0	-	1
0.40	<i>Chenopodium</i> type		e.g. fat hen	2	1	3	1
0.32	<i>Pinus</i>		pine	1	1	4	1
	<i>Betula</i>		birch	1			
0.24	Poaceae		grass family	1	1	3	1

	<i>Corylus</i> type	e.g. hazel	1		
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Key: Concentration: 0 = 0 grains; 1 = 1-75 grains, 2 = 76-150 grains, 3 = 151-225 grains, 4 = 226-300, 5 = 300+ grains per slide

Preservation: 0 = none, 1 = very poor, 2 = poor, 3 = moderate, 4 = good, 5 = excellent

Charcoal: 0 = none, 1 = negligible, 2 = occasional, 3 = moderate, 4 = frequent, 5 = abundant

RESULTS AND INTERPRETATION OF THE DIATOM ASSESSMENT

Twelve sub-samples were taken from borehole <BH6> for the assessment of diatoms. The results are displayed in Table 10.

Diatoms were present in eight of the samples in generally low to moderate concentrations, with only one sample recording a high concentration of diatoms and a good potential for a full percentage count (1.84 to 1.83m OD). In general, the remaining samples that do contain diatoms have low potential for a full percentage count, due to low to moderate preservation or diversity. Two samples (2.00 to 1.99m OD and 0.56 to 0.55m OD) have some potential for a percentage count, and may provide enough diatoms for further analysis.

Table 10: Summary diatom assessment results borehole <BH6>, A228 Stoke Bridge, Stoke, Isle of Grain, Kent

Depth (m OD)		Diatom concentration	Quality of preservation	Diversity	Potential for % count
From	To				
2.32	2.31	None	-	-	None
2.00	1.99	Moderate	Moderate	Moderate	Some
1.84	1.83	High	Moderate	Good	Good
1.68	1.67	Low	Moderate	Low	Low
1.36	1.35	Low	Poor	Moderate	Low
1.04	1.03	Low	Poor	Low	Low
0.92	0.91	None	-	-	None
0.72	0.71	None	-	-	None
0.56	0.55	Moderate	Moderate	Moderate	Some
0.40	0.39	Low	Poor	Low	Low
0.24	0.23	Low/Moderate	Moderate	Low/Moderate	Low
0.08	0.07	None	-	-	None

RESULTS AND INTERPRETATION OF THE MACROFOSSIL ASSESSMENT

A total of nine small bulk samples were extracted for the recovery of macrofossil remains including waterlogged plant macrofossils, waterlogged wood, insects and Mollusca (Table 11).

The results of an initial assessment indicated that of the nine samples, three (2.12 to 2.02; 0.63 to 0.53 and 0.43 to 0.33m OD) contained no macrofossil remains; in addition, none of the samples contained charred plant remains (charcoal or seeds), Mollusca, bone or artefacts.

Four of the samples contained waterlogged seeds (including 1.90 to 1.80; 0.73 to 0.63 and 0.53 to 0.43m OD), one of these also containing insects and fragments of waterlogged wood (0.33 to 0.23m OD). Sample 1.90 to 1.80m OD contained both waterlogged seeds and fragments of waterlogged wood. Low quantities of insects were also observed in four samples (1.40 to 1.30; 0.83 to 0.73; 0.73 to 0.63 and 0.53 to 0.43m OD).

Table 11: Results of the macrofossil assessment of borehole <BH6>, A228 Stoke Bridge, Stoke, Isle of Grain, Kent

Sample Depth (m OD)	Borehole	Volume sampled (l)	Size of context sampled (%)	Volume processed (l)	Volume remaining (l)	Fraction (e.g. float, residue, >300µm)	Charred					Waterlogged					Mollusca			Bone			Insects	Magnetic particles								
							Charcoal (>4mm)	Charcoal (>2mm)	Charcoal (<2mm)	Seeds	Chaff	Wood	Seeds	Whole	Fragments	Large	Small	Fragments	Large	Small	Fragments											
2.12 to 2.02	<BH6>	0.1	90	0.1	0.0	>300µm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
2.12 to 2.02	<BH6>	0.1	90	0.1	0.0	>1mm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
1.90 to 1.80	<BH6>	0.1	90	0.1	0.0	>300µm	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
1.90 to 1.80	<BH6>	0.1	90	0.1	0.0	>1mm	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
1.40 to 1.30	<BH6>	0.1	90	0.1	0.0	>300µm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
1.40 to 1.30	<BH6>	0.1	90	0.1	0.0	>1mm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
0.83 to 0.73	<BH6>	0.1	90	0.1	0.0	>300µm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
0.83 to 0.73	<BH6>	0.1	90	0.1	0.0	>1mm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
0.73 to 0.63	<BH6>	0.15	90	0.15	0.0	>300µm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
0.73 to 0.63	<BH6>	0.15	90	0.15	0.0	>1mm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
0.63 to 0.53	<BH6>	0.1	90	0.1	0.0	>300µm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
0.63 to 0.53	<BH6>	0.1	90	0.1	0.0	>1mm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
0.53 to 0.43	<BH6>	0.1	90	0.1	0.0	>300µm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0.53 to 0.43	<BH6>	0.1	90	0.1	0.0	>1mm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0.43 to 0.33	<BH6>	0.15	90	0.15	0.0	>300µm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0.43 to 0.33	<BH6>	0.15	90	0.15	0.0	>1mm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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0.33 to 0.23	<BH6>	0.15	90	0.15	0.0	>300µm	-	-	-	-	-	1	-	-	-	-	-	1	-
0.33 to 0.23	<BH6>	0.15	90	0.15	0.0	>1mm	-	-	-	1	-	-	-	-	-	-	-	-	-

Key: 0 = Estimated Minimum Number of Specimens (MNS) = 0; 1 = 1 to 25; 2 = 26 to 50; 3 = 51 to 75; 4 = 76 to 100; 5 = 101+

RESULTS OF THE WATERLOGGED PLANT MACROFOSSIL ASSESSMENT (SEEDS AND WOOD)

The results of the macrofossil rapid assessment indicated that waterlogged plant macrofossils (seeds and wood) were present in five of the samples assessed (Table 11), and thus underwent a more detailed assessment. The results of the waterlogged plant macrofossil (seeds and wood) assessment are displayed in Tables 12 and 13.

The results of the waterlogged plant macrofossil assessment indicate that seeds were preserved in moderate to high concentrations in one sample (1.90 to 1.80m OD), with low concentrations of seeds in three samples (Table 12). In sample 1.90 to 1.80m OD the assemblage was dominated by herbaceous taxa including *Iva xanthifolia* (sumpweed), *Chenopodium* sp. (e.g. fat hen) and the aquatic species *Ranunculus* cf. *fluitans* (cf. water crowfoot). The remaining samples all contained seeds of the herbaceous genus *Chenopodium* (e.g. fat hen).

The concentration of seeds in the samples from borehole <BH6> was insufficient to identify any evidence of change through the profile, but it can be noted that seed taxa definitively indicative of human activity were not identified during this assessment. All samples are indicative of open conditions dominated by herbaceous taxa, with shallow water also indicated in the uppermost sample.

The results of the waterlogged wood assessment indicate that of the small quantity of fragments, none were large enough to be identified (Table 13).

Table 12: Results of the waterlogged plant macrofossil (seeds) assessment of borehole <BH6>, A228 Stoke Bridge, Stoke, Isle of Grain, Kent

Sample depth (m OD)	Latin name	Common name	Number
1.90 to 1.80	<i>Chenopodium</i> sp.	e.g. fat hen	1
	<i>Iva xanthifolia</i>	sumpweed	5
	<i>Ranunculus</i> cf. <i>fluitans</i>	cf. water crowfoot	21
0.73 to 0.63	<i>Chenopodium</i> sp.	e.g. fat hen	2
0.53 to 0.43	<i>Chenopodium</i> sp.	e.g. fat hen	1
0.33 to 0.23	<i>Chenopodium</i> sp.	e.g. fat hen	1

Table 13: Results of the waterlogged plant macrofossil (wood) assessment of borehole <BH6>, A228 Stoke Bridge, Stoke, Isle of Grain, Kent

Sample depth (m OD)	Latin name	Common name	Number
1.90 to 1.80	Fragments too small to identify	-	N/A
0.33 to 0.23	Fragments too small to identify	-	N/A

DISCUSSION AND CONCLUSIONS

The aim of the environmental archaeological assessment was to evaluate the potential of the sedimentary sequences for reconstructing the environmental history of the site and its environs, and specifically to: (1) identify evidence of change or continuity through time; (2) establish whether any significant spatial variability exists across the site, and (3) to detect evidence of human activity. An assessment of one core was carried

out from borehole <BH6> as it was located within the deeper alluvial sequence at the eastern end of the transect, and of these boreholes was the most organic-rich.

The results of the lithostratigraphic descriptions indicate that there is an obvious contrast between the sediment sequences at the western and eastern ends of the transect- at the western end, the contact between fine-grained silty and clayey alluvial sediments and the underlying sand and gravel is some 2.0m higher than it is at the eastern end of the transect. It seems likely that the organic remains and rooting horizons seen in boreholes <BH4>, <BH5> and <BH6> at levels close to OD represent deposition and plant growth in a shallow, low lying depression, possibly a channel, cut into the sandier, inorganic sediments that are represented in boreholes <BH1>, <BH2> and <BH3>. The organic sediments are almost certainly of Holocene age (supported by a date of 8036-7874 cal BP at 0.66 to 0.58m OD) and were probably deposited in a tidal creek; the underlying sand and gravel is unlikely to be later than Late Devensian and probably represents deposition by a branch of the River Medway.

The organic sediments within borehole <BH6> (0.23 to 0.81m OD) were silt and clay rich, recording organic matter content of a maximum of 6%, indicating frequent influxes of mineral-rich sediment during its formation. A radiocarbon date of 8036-7874 cal BP indicates that the organic sediment accumulated in the Early Holocene, around the time of the Boreal-Atlantic transition and the Middle Mesolithic cultural period.

The sediments revealed by this investigation are similar in nature to those found immediately to the north during previous investigations by *Quaternary Scientific* and AMEC (Green et al., 2008). Here, silty alluvium containing some organic and peaty horizons was found overlying sand and gravel at -2.85m and -4.63m OD, indicating that the alluvial sequences at Stoke Bridge are shallower than those to the north, but that they most likely represent the same history of alluviation.

The combined results of the archaeobotanical (pollen, waterlogged wood and seeds) and zooarchaeological (diatoms, insects and Mollusca) records from borehole <BH6> indicate that little can be said about the environmental conditions during the accumulation of the organic and silty clay units, other than that the samples are indicative of open conditions dominated by herbaceous taxa, with possible evidence for a transition to more open conditions sometime after 8036-7874 cal BP. More aquatic conditions are tentatively indicated by the waterlogged seed assemblage towards the top of the sequence.

RECOMMENDATIONS

The results of the environmental archaeological assessment have revealed that archaeobotanical and zooarchaeological remains are poorly preserved in the sedimentary sequence from borehole <BH6>. Further environmental archaeological analysis is therefore not recommended.

REFERENCES

Battarbee, R.W., Jones, V.J., Flower, R.J., Cameron, N.G., Bennion, H.B., Carvalho, L. & Juggins, S. (2001) *Diatoms*. In (J.P. Smol and H.J.B. Birks eds.), *Tracking Environmental Change Using Lake Sediments Volume 3: Terrestrial, Algal, and Siliceous Indicators*, 155-202. Dordrecht: Kluwer Academic Publishers.

Bengtsson, L. & Enell, M. (1986) Chemical Analysis. In (Berglund, B.E. ed.) *Handbook of Holocene palaeoecology and palaeohydrology*, 423-451. Chichester: John Wiley and Sons.

British Geological Survey (1977) 1:50,000 Sheet 272 Chatham

Bronk Ramsey C. (1995) Radiocarbon Calibration and Analysis of Stratigraphy: The OxCal Program, *Radiocarbon* **37 (2)**: 425-430.

Bronk Ramsey C. (2001) Development of the Radiocarbon Program OxCal, *Radiocarbon* **43 (2a)**: 355-363.

Bronk Ramsey, C. (2007) Deposition models for chronological records. *Quaternary Science Reviews* (INTIMATE special issue; 27(1-2): 42-60.

Cappers, R.T.J., Bekker R.M. & Jans J.E.A. (2006) Digital Seed Atlas of the Netherlands. Groningen Archaeological Series 4. Barkhuis, Netherlands

C.P. Green, D. Young, P. Morgan, K. Williams and C.R. Batchelor (2008) *A report on the geoarchaeological field investigations: Grain to Shorne Gas Pipeline, North Kent*. Quaternary Scientific, Unpublished report.

Hather, J. G. (2000) *The Identification of the Northern European Woods: A Guide for archaeologists and conservators*. Archetype Publications Ltd, London.

MoLA (2010) *Stoke Level Crossing, Kent, ME3 A report on the geoarchaeological monitoring of geotechnical investigations*. Museum of London Archaeology, unpublished report.

Moore, P.D., Webb, J.A. and Collinson, M.E. (1991) *Pollen Analysis* (2nd Ed.). Oxford: Blackwell.

Reille, M. (1992) *Pollen et Spores d'Europe et d'Afrique du Nord*. Marseille : Laboratoire de Botanique Historique et Palynologie.

Reimer, P.J., Baille, M.G.L., Bard, E., Bayliss, A., Beck, J.W., Bertrand, Blackwell, P.G., Buck, C.E., Burr, G.S., Cutler, K.B., Damon, P.E., Edwards, R.L., Fairbanks, R.G., Friedrich, M., Guilderson, T.P., Hogg, A.G., Hughen, K.A., Kromer, B., McCormac, G., Manning, S., Bronk Ramsey, C., Reimer, R.W., Remmele, S., Southon, J.R., Stuiver, M., Talamo, S., Taylor, F.W., van der Plicht, J. and Weyhenmeyer, C.E. (2004) IntCal04 terrestrial radiocarbon age calibration, 0-26 cal kyr BP, *Radiocarbon* **46 (3)**, 1029-1058.

Schweingruber, F.H. (1990) *Anatomy of European woods*. Eidgenössische Forschungsanstalt für Wald, Schnee und Landschaft, Birmensdorf (Hrsg.). Haupt, Bern und Stuttgart.

Schoch, W., Heller, I., Schweingruber, F. H., and Kienast, F. (2004) *Wood anatomy of central European Species*. Online version: www.woodanatomy.ch.

Stace, C. (2005) *New Flora of the British Isles*. Cambridge: Cambridge University Press.

Troels-Smith, J. (1955) Characterisation of unconsolidated sediments. *Danmarks Geologiske Undersøgelse, Raekke IV(3)*, 38-73.

Williams, J. (2010) *A228 Stoke Bridge – Main Site and South Field. Archaeological Written Scheme of Investigation*. Mott MacDonald, unpublished report.

Appendix D - AMS Radiocarbon Dating Form



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RADIOCARBON DATING CERTIFICATE

16 December 2010

Laboratory Code	SUERC-32537 (GU-22942)
Submitter	Melissa Melikian AOC Archaeology Group Unit 7, St Margarets Business Centre Moor Head Road Twickenham, TW1 1JS
Site Reference	Stoke Crossing, Kent
Sample Reference	SBBH6284-292
Material	Peat : Humin
$\delta^{13}\text{C}$ relative to VPDB	-24.2 ‰

7155 ± 40

Radiocarbon Age BP

- N.B.**
1. The above ^{14}C age is quoted in conventional years BP (before 1950 AD). The error, which is expressed at the one sigma level of confidence, includes components from the counting statistics on the sample, modern reference standard and blank and the random machine error.
 2. The calibrated age ranges are determined from the University of Oxford Radiocarbon Accelerator Unit calibration program (OxCal3).
 3. Samples with a SUERC coding are measured at the Scottish Universities Environmental Research Centre AMS Facility and should be quoted as such in any reports within the scientific literature. Any questions directed to the Radiocarbon Laboratory should also quote the GU coding given in parentheses after the SUERC code. The contact details for the laboratory are email g.cook@suerc.gla.ac.uk or Telephone 01355 270136 direct line.

Conventional age and calibration age ranges calculated by :-

Date :-

Checked and signed off by :-

Date :-

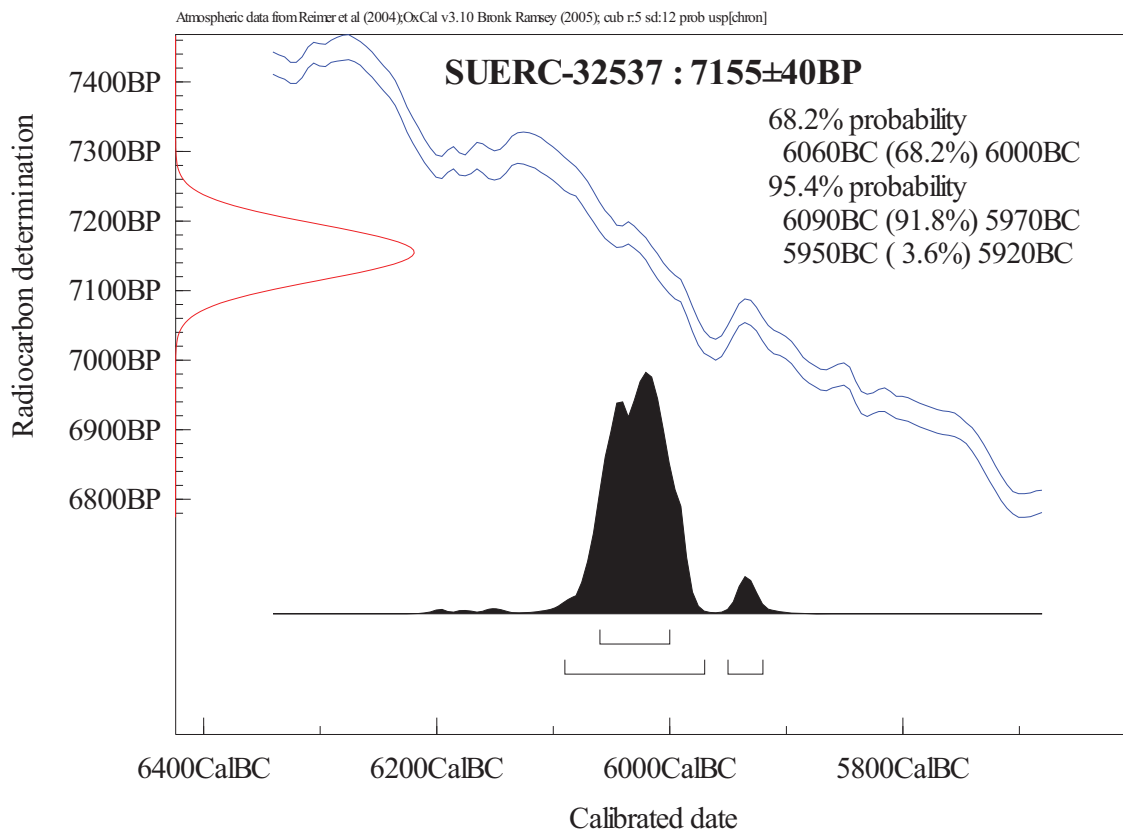


The University of Glasgow, charity number SC004401



The University of Edinburgh is a charitable body, registered in Scotland, with registration number SC005336

Calibration Plot



Appendix E - OASIS Form

Printable version

OASIS ID: aocarcha1-92429

Project details

Project name Stoke Bridge, Kent

Short description of the project

An Archaeological Strip, Map and Sample investigation was carried out at the Stoke Bridge. Natural gravels were observe in the Main Site and were overlain by subsoil deposits and topsoil. Further to the east and in the South Field alluvial clays were observed up to 3.30m thick. The limited groundworks conducted on the Cooling site revealed alluvial clay overlain by a sequence of subsoil and topsoil. Roman pottery was retrieved from the subsoil on the Main Site, as well as a single unstratified sherd of Iron Age pottery. The geoarchaeological investigation revealed that the landscape was mainly open grassland between successive period where the area became marshy and the alluvial clays were deposited.

Project dates Start: 01-09-2010 End: 12-11-2010

Previous/future work No / Not known

Any associated project reference skb 10 - Sitecode codes

Any associated project reference 30804 - Contracting Unit No. codes

Type of project Recording project

Site status None

Current Land use Cultivated Land 2 - Operations to a depth less than 0.25m

Monument type NONE None

Significant Finds POTTERY Iron Age

Significant Finds POTTERY Roman

Significant Finds POTTERY Post Medieval

Significant Finds ANIMAL BONE Post Medieval

Investigation type 'Watching Brief'

Prompt Direction from Local Planning Authority - PPS

Project location

Country England

Site location KENT MEDWAY STOKE Stoke Bridge, Main Site, South Field and Cooling Site

Study area 5.20 Hectares

Site coordinates TQ 8426 7560 51.4488131209 0.652056843210 51 26 55 N 000 39 07 E
Point

Site coordinates TQ 7584 7831 51.4758465756 0.532345699473 51 28 33 N 000 31 56 E
Point

Project creators

Name of Organisation AOC Archaeology

Project originator brief Kent County Council

Project originator design Mott MacDonald

Project director/manager Melissa Melikian

Project supervisor Ian Hogg

Type of
sponsor/funding body Consultancy

Name of
sponsor/funding body Mott MacDonald

Project archives

Physical Archive recipient AOC Archaeology

Physical Contents 'Animal Bones','Ceramics'

Digital Archive recipient AOC Archaeology

Digital available Media 'Images raster / digital photography','Text'

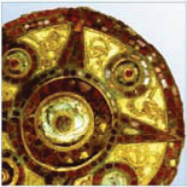
Paper Archive recipient AOC Archaeology

Paper Contents 'Stratigraphic'

Paper available Media 'Context sheet','Plan','Report','Section'

Entered by Ian Hogg (ian.hogg@aocarchaeology.com)

Entered on 3 February 2011



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