TRANSFORMING TATE MODERN
Bankside
London SE1

London Borough of Southwark

An archaeological evaluation and watching brief report

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MUSEUM OF LONDON ARCHAEOLOGY

REGISTERED ORGANISATION IfA

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Bankside
London SE1

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Site Code: TMB09
National Grid Reference: 531925 180390

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Summary (non-technical)

This report presents the results of an archaeological works carried out by Museum of London Archaeology (MoL Archaeology) on the site of Transforming Tate Modern London, SE1. The report was commissioned from MOL Archaeology by Mills Whipp Projects on behalf of the Board of Trustees of the Tate Gallery.

Following the recommendations of The London Borough of Southwark's designated archaeological advisor two archaeological evaluation trenches were excavated on the site, in the location of proposed pile positions. Prior, during and after the evaluation a watching brief was maintained on six borehole positions to the west and north of the Tate Modern building. These boreholes were excavated in advance of the proposed construction of a groundwater cooling system for the new building as part of a sustainable energy programme for the new building.

The results of the field evaluation and watching brief have helped to refine the initial assessment of the archaeological potential of the site. It has been established that deposits and artefactual evidence dating from the Roman to post-medieval periods survive in the south-western part of the site. Some evidence for undated peat deposits, possibly prehistoric or later in origin was located during the excavation of BH2 to the northwest of the Tate Modern building.

Excavation of boreholes in the western and northern parts of the site provided evidence for survival of deposits and waterfront structures, with artefacutal material recovered that dated from the Roman, medieval and post-medieval periods..

In the light of revised understanding of the archaeological potential of the site the report concludes that proposed pile positions to the southwest of the site would remove and destroy archaeological deposits and structures dating from the medieval onwards and that some further archaeological monitoring of works in this area may be prudent .

Following the results of the watching brief on borehole positions, the report suggests that any further deep excavations or groundworks, particularly to the north of the Tate Modern, have the potential to remove and destroy deposits which may date from the prehistoric period onwards. Waterfront structures dating back to as early as the twelfth century are known to survive in the northern area of the site. The report recommends that any further groundworks of significant depth in this area should be subject to further archaeological work, the nature of which should be appropriate to the extent of the works proposed.

Contents

List Of Illustrations (Figures at back of report)

Front cover: Excavation of BH3

Index of Tables

1 Introduction

1.1 Site background

The evaluation and watching brief took place at the Tate Modern, London SE1, hereafter called 'the site'. It is located in the area surrounding the Tate Modern building bounded by Hopton Street to the west, Holland Street and Sumner Street to the south and Bankside to the north, see Fig 1. The OS National Grid Ref. for centre of site is 531925 180390.

In the location of the evaluation trenches ground level varies between 5.54 and 4.15m OD. To the west of the Tate Modern ground level adjacent to Borehole 1 was 4.12m OD, whilst to the south in Borehole 5 it was just 3.52m OD. In front of the Tate Modern ground level for boreholes 2, 3, 4 and 6 varied between 5.39m OD and 5.70m OD. The site code for all excavations is TMB09.

The proposed development of the site involves the construction of a new building requiring large pile caps. As part of a sustainable energy program for the new building the construction of a groundwater cooling system including harvesting tanks is also proposed. Transforming Tate Modern aims to increase the capacity of the gallery by 60% with the construction of the new building.

Prior to the recent excavations MoL Archaeology were commissioned to contribute a chapter in respect of archaeological remains and the built heritage to an environmental statement for the site (Planning application submitted by the board of trustees of the Tate Gallery, Environmental statement Vol 1: Chapter 14 , Archaeology and Built Heritage). This chapter summarised the potential for archaeological survival on the site and identified areas of maximum archaeological potential.

Two areas of the site to the north of the Tate Modern were previously subject to archaeological investigation, these were the Millennium Bridge Southern Bank (MFB98) and Royal George Wharf (BS78).

The evaluation and watching brief program was agreed in consultation with the London Borough of Southwark's designated archaeological advisor.

The work was commissioned by Mills Whipp Projects on behalf of the Board of Trustees of the Tate Gallery. On site attendance for the boreholes was arranged via Gardiner & Theobald Management Services who are managing Transforming Tate Modern.

1.2 Planning and legislative framework

The site is situated within the Southwark Archaeological Priority Zone and Bankside and Bear Gardens Conservation Area as specified by the London Borough of Southwark. Tate Modern 1 is not a Listed Building and no Listed Buildings are present within the site boundary.

The planning and legislative background has already been adequately summarised in the Chapter contributed by MoL Archaeology to the environmental statement (MoL Archaeology 2008).

1.3 Planning background

A planning application has been granted subject to a condition that an archaeological evaluation be carried out prior to any development in order to assess the requirement for any further archaeological mitigation on the site. As part of the planning constraints a watching brief was also requested on borehole interventions.

1.4 Origin and scope of the report

This report was commissioned by Mills Whipp Projects on behalf of the Board of Trustees of the Tate Gallery and produced by MOL Archaeology. The report has been prepared within the terms of the relevant Standard specified by the Institute for Archaeologists (IFA, 2001).

Field evaluation, and the *Evaluation report* which comments on the results of that exercise, are defined in the most recent English Heritage guidelines (English Heritage, 1998) as intended to provide information about the archaeological resource in order to contribute to the:

- formulation of a strategy for the preservation or management of those remains; and/or
- formulation of an appropriate response or mitigation strategy to planning applications or other proposals which may adversely affect such archaeological remains, or enhance them; and/or
- formulation of a proposal for further archaeological investigations within a programme of research

1.5 Aims and objectives

All research is undertaken within the priorities established in the Museum of London's *A research framework for London Archaeology*, 2002

The following research aims and objectives were established in the *Method Statements for* the evaluation and watching brief (Section 2.2):

- What was the level of natural topography?
- What are the earliest deposits identified?
- What are the latest deposits identified?

2 Topographical and historical background

2.1 Topography

After the last Ice Age (approximately 12,000years ago) the area formed a low-lying floodplain with areas of higher ground intersected with streams and rivulets. The basic geology consists of London Clay of Eocene date overlain to the south by relatively recent flood plain gravel. Certain areas of higher ground have been identified and are referred to as 'eyots'. Generally the eyots have a surface level of 1m OD. The land surface in these areas consisted of naturally deposited sand or gravels overlying clay.

The earliest deposit excavated at New Globe Walk was alluvium, overlain by organic material filling a former channel of the Thames from -0.05m OD to +0.15m OD. At Skinmarket Place, 150m to the east, part of a natural sand and gravel island was recorded at +0.66m OD. Also to the east, at Southbridge House, Tilbury IV peats, sealed by water-lain clays, were recorded at -0.30m OD. Important evidence of activity dating to the Neolithic/Bronze Age has been recorded immediately to the west of the site at Hopton Street, including possible land surfaces at a height of between +0.94m to +1.12m OD. Land use indicative of probable land clearance, agricultural practices and occupation was found, suggesting that this area may have been situated on an eyot. Natural sands and gravels were recorded at a height of between 0.10m OD and 0.42m OD. At 135 Park Street a sequence of Late Bronze Age peat, dated to 1310-1040 BC (2970±40 BP) was revealed, truncated by fluvial action. A sequence of Late Bronze Age peat, dated to 1310-1040 BC (2970±40 BP), was also revealed.

Previous ground investigation in the vicinity of the site has revealed alluvium between 1m OD and –1.80m OD and natural gravels between 0m OD and –5.20m OD. London Clay has been recorded between –5.50m OD and –6.35m OD.
The northern limit of the Tate Modern 2 Development is located approximately 155m to the south of the present bank of the River Thames. The modern ground level in the vicinity ranges from approximately 3.80m to 5.70m OD.

2.2 Prehistoric

The Thames, in Prehistory, was a much wider, shallower, slower flowing river than today. The Southwark bank comprised a marsh with numerous channels and gravel islands of higher, drier ground.

At Emerson Place, flint implements dating to the Mesolithic period were recovered in the 19th century and lithics discovered at Hopton Street were also found to contain a small percentage of Mesolithic to Early Neolithic material. An excavation at Skinmarket Place revealed Neolithic pottery and flint artefacts. This evidence was found to be sealed by water-lain clays, which, in turn, were cut by early medieval ditches.

Past excavations at Hopton Street and Holland Street have revealed the site to be located on a natural sand eyot, which was occupied during the late Neolithic/early Bronze Age. This included a possible Neolithic/Bronze Age land surface and evidence of ard marks, postholes, pits, flint work and pottery of a similar date.

Holland Street was subsequently covered by a layer of alluvium and not utilized until the 16th century.

2.3 Roman

During the Roman period the site would have been located on the edge of a river channel with an island of higher ground in the northern part of the site. With rising tidal levels in the subsequent centuries the area would certainly have become marshy and would have periodically flooded. However, to the south of the site at Ewer Street Roman finds were discovered in the 19th century. The finds included coins, pottery and glass objects, which were potentially associated with inhumations. A coin hoard was also found in 1864. This suggests that the site and immediate vicinity may have been accessible for a time during the Roman period. Archaeological salvage work in 1980 at 58 Park Street recorded a Roman timber revetment consisting of pile-driven oak posts with horizontal planks behind them, set into a marsh deposit. It most likely bordered a channel to the west, and formed part of a land reclamation scheme to contain the marsh and drain the ground. Dating evidence from behind the revetment suggests that it was not constructed before the late 3rd century.

2.4 Saxon

There is no archaeological evidence for Saxon activity in the locality of the site, although some development along the riverfront is documented by the time the Domesday Book was compiled in 1086 when the area was designated a 'Liberty' of autonomous monastic land.

2.5 Medieval

In 1127 the area became part of the Bishop of Winchester's manor and became known as the Liberty of the Clink after the Bishop's infamous prison. The area was also located within the parish of St. Saviour's Church (now Southwark Cathedral). Owing to its proximity to London and its lax regulations, the riverfront 'stews' developed into a series of inns, gambling dens and brothels. Maid Lane (now Park Street) to the south possibly owes its name to the brothels along the riverfront. The river channel to the east would have silted up by this time leaving deep alluvial deposits in this south-eastern area of the site.

The first recorded attempts at reclamation date to the 14th century, probably as a response to rising river levels when revetments or dykes were constructed along the line of Upper Ground and Belvedere Road, to the northwest of the present site. The embankment also appears to have formed the common way between Lambeth and Bankside. Most of the land was marginal, although gradually drained and developed for agriculture. A network of watercourses, drainage ditches and earthworks were also constructed to the south of the river during this period. The land behind these embankments remained low-lying, marshy and most likely periodically flooded until well into the post-medieval period. In the later post-medieval period a number of mills were recorded in the area, in St George's Field's, Hopton Street and Upper Ground. At Hopton Street remains of a medieval tidal mill pond and ditches have been recorded indicating the site of a mill in the vicinity of the site.

Work at Millennium Bridge (MFB98) revealed a sequence of timber revetments, with the earliest activity thought to be approximately 12th century in date. At 37–67 Bankside excavation exposed the tops of at least three parallel east-west revetments of possible late medieval (and post-medieval) date. At Skinmarket Place earlier water-lain clays were cut by early medieval ditches. These were sealed by water-lain

clays (possibly deposited during the 14th or 15th centuries), which were then cut by later post medieval features. The excavation also recorded evidence of the King's Pike Garden, in the form of timber-revetted fishponds. A medieval sword has been found within the site area and evidence of Late medieval activity has also been found on the site in the form of a well, wall, piling and dumps dating to the 16th century. The area along Bankside was possibly reclaimed in an earlier period and excavations at Benbow House recorded the dumping of crushed chalk to consolidate the land before building upon. Buildings with chalk walls and a large cellar were constructed in the 14th century fronting onto Bankside.

Previous excavations associated with the construction of the Millennium Bridge (MFB98). A succession of four waterfront advances was recorded in varying states of survival. Many of these structures possessed evidence of more than one construction phase and several were built using reused timbers derived from buildings or river vessels. The earliest of these waterfront structures was dated dendrochronologically to 1127. The latest of the waterfront structures attributed to the medieval period was dated dendrochronologically to post 1349. Excavations to the west of the millennium bridge in 1978 recorded evidence for foreshore deposition dating back to the 14th century. There was also evidence for late 15th to early 16th century waterfront timber structures along with remains of leather.

2.6 Post-medieval

By the 16th century, development was spreading south from the riverfront and animal baiting rings appeared in the 1540s, a 'sport' which was to remain popular here until well into the 17th century. In 1545 there was an injunction against *'...common players who haunt the Bankside'* by which time the whole area had clearly become an entertainment centre. Braun and Hogenburg's map of *c* 1572 shows the northern part of the site as lying in the garden plots of the residential houses lining the frontage of Bankside.

From the 17th century, cartographic sources give more detailed information regarding land use and development. The 17th century map by William Morgan shows the site in greater detail. The site lies in a large field referred to as 'Pye Garden' possibly the remains of the Pike Gardens. The centre of the site is open ground. Gravel Lane is the site of a late 17th century stoneware and tin glazed pottery works. During construction of the Bankside Power Station (now Tate Modern 1) in 1949-50, stoneware and tin glazed ware wasters were found whilst digging the foundations.

Around the site those areas not built over were extensively cultivated with some surviving indication of the earlier drainage channels. The open land was probably given over to grazing, orchards and market gardening. Rocque's map of 1746 shows the area had developed considerably since the 17th century and the industrial focus of the area is clear. The area of the proposed Development lies over a number of properties. The western area lies over the Peacock brewhouse and Cockpit Court, which may be associated with the Glassworks that lies just to the north. The eastern area lies over the southerly part of Pye Garden and south of an industrial timber yard. From the late 18th century commercial and industrial premises and tenements rapidly developed the area. Excavations at Hopton Street to the west of the site recorded the presence of a series of 18th to 19th century glasshouses/kilns. Horwood's map of the early 19th century shows that the timber yard appears to have expanded westward and associated buildings now cover the majority of the proposed development site. Residential tenements fronting Pits Place have replaced Pye Gardens.

By the later 19th century the site is more extensively covered by structures as shown on the 1873 Ordnance Survey map. These comprise the Phoenix gas works, an engineering works, whitelead works, saw mills and timber yard, buildings and yards associated with Phoenix Wharf, stables and an iron yard in the north-west and a number of residential tenements over much of the remaining area of the site. By 1896 the layout of buildings on the site had not changed significantly, although buildings which housed the saw mills and whitelead works are no longer in existence. The Phoenix Gas Works are no longer named, although the structures appear the same in the plan. The 1916 Ordnance Survey map shows the western area of site as little changed however, the residential housing previously in the central and southern site area no longer appears on the map and has probably been demolished. The area previously occupied by the gas works was later acquired by the City Electric Light Company in 1938 and the Bankside Power Station was later erected on the site.

The 1951 map shows the partly completed Bankside Electricity Works on the location of the current Tate Modern. The report on Contamination at Bankside states that: *'Construction of the existing larger oil-fired power station started in 1938, was interrupted by World War II, and continued in a series of phases until completion in 1963.'* It would therefore seem that the electricity works was under construction at this time. In the eastern part of the Tate Modern site, two tanks are shown and a coal conveyor is shown to run to the eastern edge of the site.

In the eastern part of the site, all the terraced houses present in the 1916 map have been demolished and small buildings including a gantry have replaced them. A chemical works is present immediately east of the site and just within the site boundary. In the western area of site, further residential terracing has been demolished and the gas purifiers have been removed. Construction and minor changes continued on the site of the power station until it ceased operation in 1982.

The present building was constructed as a power station in two phases to a design by Sir Giles Gilbert Scott. The Building contractors were Sir Robert McAlpine and Sons for Phase 1, and Higgs and Hill for Phase 2. The first phase, which comprised the western half of the building including the single chimney, was completed in 1953, prior to demolition of the old coal-fired power station. The eastern section followed and was commissioned in 1963. The station was oil-fired and ceased operation in 1982. The building is a brick-clad steel structure, symmetrical with a central square tower-like chimney 99 metres (m) (325 foot (ft)) high.

The site was later purchased by The Trustees of the Tate Gallery. The Boiler House and Turbine Hall were converted to form the first section of Tate Modern 1, which opened in 2000. The building has been converted by the leading Swiss architects Herzog & de Meuron, whose plans have highlighted the building's new function while respecting the integrity of Sir Giles Gilbert Scott's original design. The most noticeable change to the exterior of the building is a new two-storey glass structure or Light Beam spanning the length of the roof. EDF Energy continues to use the Switch House as a major sub-station and control area. In the south-western area of the site, beneath a paved terrace lawn (i.e. underground), are three 40m diameter disused oil storage tanks, each having a capacity of 4,000 tons, which cover the southern area of proposed building (Tate Modern 2). To the east of the Tate Modern 2 site, between the remainder of the EDFE-occupied Switch House and the EDFE tunnel access to the south is an area currently occupied by the Southeast Annexe and neighbouring single storey buildings.

Excavations at Millennium Bridge recorded a series of post medieval waterfront structures. The earliest of these was dated dendrochronologically to 1555–1583 and had utilised timber reused from a barge. A sequence of five waterfronts was attributed to the post-medieval period pre-dating the 19th century.

3 The evaluation

3.1 Methodology and circumstances and dates of fieldwork

All archaeological excavation and monitoring during the evaluation and watching brief were carried out in accordance with the preceding *Method Statement* (MOL Archaeology, 2009), and the *Archaeological Site Manual* (MoLAS, 1994).

Prior to the evaluation four borehole positions were initially monitored between 20/4/2009 and 21/4/2009 as part of (unexploded ordnance (UXO) probing). BH1 was located to the west of the ramped entrance into the west side of the Tate Modern. BH2 was located to the north of the Northwest corner of the Tate modern. BH3 was located to the north of the northeast corner of the Tate Modern and BH4 was located to the east of the footbridge. In all cases ground was broken out by contractors using a small machine. The borehole positions were then excavated by machine down to between 1.2m and 2m. BH1 and BH2 were then probed by a UXO locating probe down to 6.5m. This was carried out in order to establish safety clearance for subsequent borehole excavation.

It was not possible to probe BH3 and BH4 due to the depth of impenetrable material.

These boreholes were later re-excavated during the 11/5/2009-12/5/2009 using a larger machine. The positions were then excavated to 4.4m below ground level and scanned for Ordnance using a hand held probe.

From 29/4/2009 – 8/5/2009 May the borehole excavation of BH1 was monitored from 2m below ground level to 12m below ground level. The borehole process allowed hand inspection of upcast material and inspection of samples retained by the borehole crews so a good estimate of stratigraphic levels was possible.

On the 30/4/2009 Borehole excavation of BH2 was observed from 4m below ground level to 7.5m below ground level. The borehole was subsequently monitored between 6th May 2009 and 8th May 2009. Material retained by contractors was able to be hand inspected.

Between 1/6/09 and 9/6/09 clearance of BH3 of obstructions was observed. Excavation of this borehole was then monitored between 10/6/09 and 16/6/09.

Excavation of BH4 was further monitored between 8/6/2009 and 12/6/2009.

Excavation of BH5 was monitored between 16/6/2009 and 19/6/2009. This borehole only required breaking out by hand of the overlying surface prior to bored excavation.

Excavation of BH6 was monitored between 6/7/09 and 20/7/09 .The position was initially broken out by machine to the width of the borehole and 4m depth was bored using a machine to break through obstructions, within the casing of the borehole. This approach proved unfeasible due to the extent of obstructions. The casing was removed and a large Trench excavated by machine to a depth of up to 5m. Problems were encountered with contamination on the south side of the trench. The Trench was enlarged to enable a 'box' to be inserted so that contamination could be isolated. This box was then removed and the trench further excavated to remove obstructions. The extent of these obstructions necessitated the expansion of the trench to its final

size of 3.7m x 3m, to allow the borehole to be re-positioned on the south side of the hole.

Borehole positions were plotted at 1:100 by offsetting from standing buildings and landscaped features using a drawing MF-DR-M-S [16]0011 provided by the client. This information was then plotted onto the OS grid by MoL Archaeology surveyors. Ground levels adjacent to boreholes were calculated by reference to a topographical survey provided by the Gardiner & Theobald Management Services. Levels for individual contexts were calculated by reference to ground levels and depths from the borehole logs of contractors. Due to the nature of the borehole process levels from borehole records are accurate to within 0.1m.

For the larger boreholes most of the drilling was with an auger like drilling rig but for BH3 and BH6 a semi-closed mechanism which had to be opened by hand to release deposits was used due to the extent of water in the holes.

All attendance for the Boreholes was by a single MoL Archaeology senior archaeologist.

Two evaluation trenches (Trenches A and B) were excavated in the southwest area of the site, between 26/5/2009 and 11/6/2009. Trench A was located in the disabled car park to the west of the southern extent of existing buildings. Trench B was located in the gardens immediately southwest of the south-western corner of the existing buildings. These evaluation trenches were positioned within proposed pile positions for the new extension to the Tate Modern.

The upper part of the evaluation trenches were excavated by machine by contractors under the supervision of the senior archaeologist. Once archaeological horizons were reached the trenches were then hand excavated by contractors and the senior archaeologist using a hoist for spoil removal. In both trenches there was hand augering of the bottom of the trench in order to establish the natural sequence.

The locations of the evaluation trenches and borehole positions were recorded by the senior archaeologist, offsetting from adjacent standing walls and features onto site survey plans provided by Gardiner & Theobald. This information was then plotted by MoL Archaeology geomatics onto the OS grid.

A written and drawn record of all archaeological deposits encountered was made in accordance with the principles set out in the MOL Archaeology site recording manual (MOLAS, 1994). Levels were calculated by reference to and transfer from levels given on the site survey provided.

The site has produced: six trench location plans; 59 context records; 2 section drawings at 1:20 and a borehole profile. Numerous pages of notes are within the records. A number of digital, colour and black and white photographs were taken. In addition several boxes of finds were recovered from the site and an environmental sample was processed. No material was required for special conservation measures.

The site finds and records can be found under the site code TMB09 in the MoL archive.

3.2 Results of the evaluation

For trench locations see Fig 2.

3.2.1 Trench A

Evaluation Trench A	
Location	Disabled Car park
Dimensions	3m x 3m x 4.4m depth
Modern ground level	5.33-5.54m OD
Base of modern deposits	4.34m OD
Depth of archaeological deposits seen	3.8m Deep
Level of base of deposits observed and/or base of trench	Base of trench 1.14m OD Base of auger hole -0.55m OD
Natural observed	Sand and gravel -0.55m OD

Trench A measured 3m x 3m at the top, but following the location of existing services the width of the trench was soon reduced by 0.5m. With the implementation of shoring the trench measured 2.1m x 2.4m at the base.

The trench was excavated to a depth of 4.4m. An auger hole was then drilled at the north end of the trench using a hand auger. This hole was terminated at circa 6m below ground level. At this level impenetrable gritty deposits were encountered which were interpreted as the upper horizon of natural sand and gravel.

Natural sand and gravel was overlain by 0.6m depth of pale yellow sticky alluvial sandy clay [23]. This was in turn sealed by 0.9m depth of pale blue grey alluvial clay [22]. Above this was 0.5m depth of dark blue grey very oxidised alluvial clay mottled with iron-pan staining and rooting. The top of the alluvial sequence was at 1.14-1.54m OD.

On the western side of the trench 0.4-0.5m depth of dumped deposits [20] overlay the alluvial sequence. These deposits contained oyster shell, animal bone and slag as well as a small amount of pottery dated to AD1630-1680. A 20 litre bulk sample <1> was taken from this deposit in order to assess the environmental potential of the deposits. A small quantity of domestic food waste in the form of animal bone was retrieved from this deposit. This included remains of ox and sheep. The upper horizon of these deposits was observed at 1.81m OD.

Similar deposits [17] were observed in section on the west side of the trench. Pottery retrieved from these deposits was dated to AD1630-1650. A piece of crucible fragment was recovered from this deposit, which is of a type used in glass manufacture. The upper horizon of [17] was recorded at 2.50m OD.

Layer [17] was located between two truncating brick features. In the south-western corner of the trench part of a brick wall [18] was observed. This wall was constructed of 65mm thick purple yellow bricks bonded with a creamy white soft lime mortar. The wall survived to a depth 0.68m with the top of the wall recorded at 2.51m OD. A single whole brick was retrieved from the wall. This brick was dated to the late 18th-19th century (AD1750-1900).

Immediately to the north of this the eastern external face of a brick well [19] was located. This feature survived to a depth of 0.8m with the truncated top of the brickwork at 2.62m OD. This feature was of similar construction to [18].

Across most of the trench the early post-medieval deposits [20] were overlain by 2m of demolition debris [15] and [16]. These deposits contained building material as well as clay tobacco pipes dating to the 18th century (AD1700-1740). Large amounts of

ginger beer bottles and tops dated to the early 20th century AD1907-1930 were retrieved from these contexts.

On the east side of the trench the excavations revealed a modern retaining wall constructed of interlocking metal trench sheets. This wall was located 2.4m west of the existing buildings. The top of this sheet piling was located at 1.5m below existing ground level at 4.04m OD.

The upper 2.2m of the trench consisted of 2m of various layers of rough concrete and compacted demolition materials interrupted by modern services. The tarmac surface of the car park was supported by 0.2-0.4m depth of rough concrete.

3.2.2 Trench B

Evaluation Trench B	
Location	Gardens to south of site
Dimensions	3m x 3m by 3.8m depth
Modern ground level	4.15m OD
Base of modern deposits	3.15-3.55m OD
Depth of archaeological deposits seen	4.2m depth
Level of base of deposits observed and/or base of trench	Base of trench 0.35m OD Base of auger hole -0.65m OD
Natural observed	Sand and gravel -0.65m OD

The trench measured 3m x 3m at the surface, but after the implementation of shoring measured 2.14m x 2.4m at the base. Approximately 2/3 of the trench was excavated to a depth of 3m, with a sondage on the north side of the trench excavated to a depth of 3.8m.

Excavation by hand auger in the base of the trench located impenetrable gritty deposits at 4.8m below ground level. This was interpreted as the upper horizon of natural sands and gravels.

The sands and gravels were overlain by 1m depth of pale yellowish grey alluvial clay [33]. This deposit became increasingly sandy towards the interface with natural sands and gravels. Overlying this was 0.7m depth of mid blue grey alluvial clay [32] containing some small gravels and occasional iron-pan staining. This was in turn sealed by 0.3m depth of weathered dark blue grey silty clay [31] which was mottled with lots of iron-pan staining and root disturbance. This deposit contained a single sherd of pottery dated to the medieval period (AD1270-1500). The top of the alluvial sequence was recorded at 1.05m OD.

The alluvial clays were overlain by 0.5m depth of dumped deposits [28]. These deposits consisted of dark reddish grey brown sandy silts containing domestic waste in the form of animal bone, oyster shell and pottery fragments as well as some industrial material in the form of slag. These deposits were identical in character to layer [20] observed in Trench A. Pottery retrieved from the deposit was dated to the mid 17th century AD1630-1650, although some residual medieval pottery dated to AD 1240-1350 was also present . The upper horizon of this layer was recorded at 1.85m OD.

Layer [28] was sealed by 1.1m depth of dumped deposits of dark grey brown sandy silts [25] containing brick and tile fragments and pottery sherds dated to the 17th century AD1630-1680. The deposit also contained clay tobacco pipes dated to

AD1660-1680. Immediately overlying this was 0.6m depth of made ground [24] from which a small quantity of pottery dated to AD1630-1700 was retrieved.

On the western side of the trench a brick drain [27] was located on a north south orientation feeding into the top of a square inlet [26] (possibly a small soakaway or inspection chamber) of 0.7m depth. These features were constructed of red and yellow brick of 60-65mm thickness bonded with a creamy pale brown sandy mortar. The top of the drain was located at 3.05m OD. The features were interpreted as not earlier than 19th century in construction.

On the east side of the trench the continuation of the sheet pile wall identified in Trench A was located. The face of this wall was recorded as 0.5m inside the eastern trench edge. The top of the trench sheeting was 0.7m below existing ground level at 3.45m OD.

Towards the top of the trench layer [24] was truncated by an east west orientated brick wall on a concrete foundation. This wall was of modern construction. The top of the wall was at 3.55-3.45m OD.

The upper part of the trench was filled with 0.5m-1m depth of compacted made ground and modern services, below 0.1m depth of path surface and 0.3m depth of garden soil.

3.3 Results of the watching brief

3.3.1 BH1

BH1	
Location	To west of ramp
Dimensions	Initial TP 0.8m x 0.4m x 1.2m Deep Borehole 1.2-1.5m Diameter x 12m deep
Modern ground surface	4.15m OD
Base of modern make up	2.90m OD
Depth of archaeological deposits seen	3.85m deep
Level of base of deposits observed and/or base of borehole	-7.88m OD
Natural observed	Sands -0.75m OD Sand and gravel -m OD London Clay -6.45m OD

BH1 Was initially machine excavated to a depth of 1.2m and measured 0.8m x 0.4m. The position was then backfilled prior to probing. The position was successfully probed for UXO to a depth of 6.5m below ground level. A borehole 1.5m diameter at the top and 1.2m diameter at the bottom was then excavated to a depth of circa 12m below ground level. Upcast material from the borehole process was able to be hand inspected and a reasonable approximation of levels obtained from the contractors, although it was not possible to observe deposits in section. Samples were retained by contractors at 1m intervals and these were able to be observed and recorded.

London clay was identified 10.6m below ground level at -6.45m OD. Above this was a sandy interface [37] of 0.6m depth. This interface was sealed by a series of natural coarse sands and gravels [36] the upper horizon of which was observed at 6.65m

below ground level -2.5m OD. These deposits were sealed by over 1.5m depth of wet sands with some gravel [4].

The sands and gravels were overlain by 2m depth of stiff sticky mid blueish grey brown alluvial clays [3] which appeared to have sand inclusions. The upper horizon of these deposits was 3m below the current ground level at circa 1.12m OD. A single sherd of pottery was retrieved from the alluvium. The fabric of this piece of pottery is consistent with Roman pottery types, but it is very abraded and a medieval date of manufacture cannot be ruled out (pers comm. Fiona Seeley).

The alluvial sequence was overlain by made ground deposits of clay sandy silt [2] containing fragments of ceramic building material and shell. Above this were post-medieval dumped deposits of sandy silt [1] with frequent fragments of brick rubble and tile as well as animal bone shell, clay tobacco pipe and some pottery, some of which was retained. The clay tobacco pipe was dated to the period AD1680-1710 while pottery was dated to post AD1600. Most of the artefactual material was obtained from close to the top of the deposits at approximately 1.2m below the current ground level

Layer [1] was overlain by 0.4m depth of modern made ground beneath 0.3m depth of compacted brick and concrete. The modern surface comprised a 0.1m thick layer of concrete beneath a similar depth layer of resin-topped tarmac.

3.3.2 BH2

BH2	
Location	North of NW corner of Tate
Dimensions	Initial TP 0.4m x 0.8m x 1.2m deep Borehole 0.21m diameter x 14.5m deep
Modern ground surface	5.53m OD
Base of modern make up	4.03m OD approx
Depth of archaeological deposits seen	6m deep
Level of base of deposits observed and/or base of borehole	-9.0 m OD
Natural observed	Gravel -1.97m OD London Clay circa -5.5m OD reported

BH2 was initially excavated by machine down to 1.2m below ground level. The position was then backfilled prior to UXO probing. The position was then successfully probed down to 6.5m below ground level. A borehole of 0.21m diameter was then excavated to approximately 14.5m below ground level.

Throughout the borehole excavation contractors emptied the residue from the borehole into a tank and shovelled material into buckets. This allowed some hand inspection of deposits and some finds retrieval. The borehole was not observed between 1.2m and 4m below ground level, but information was obtained from contractors on site log.

The contractor's records reported London Clay as encountered at circa 11m below ground level.

The upper horizon of sands and gravels [5] was observed at approximately 7.5m below the current ground level. These gravels were noticeably larger and more shingle/foreshore like than those observed in BH1.

The gravels were overlain by undated peaty clay [6] to a depth of approximately 1m. These peat deposits were overlain by gravels [7] containing large pieces of wood and fragments of ceramic building material and animal bone, some of which was retained for dating. This building material was dated to the Roman period AD50-160. Above [7] was 1.2m depth of firm grey brown sandy clays [8] containing gravel inclusions, fragments of building materials and large pieces of wood. The amount of wood retrieved suggested that given the proximity of the borehole to the waterfront, the borehole may have penetrated a revetment or waterfront structure of medieval or post-medieval date, similar to those found during the Millennium Bridge excavations (Ayre and Wroe-Brown, 2002).

Overlying [8] was a deposit of firm grey brown sandy clay [9] containing oyster shell and gravel inclusions. This was in turn overlain by 1.1m depth of what appeared to be dumped deposits of sandy clays [10] containing small to medium sized stones and brick and tile fragments. Pottery retrieved from [10] was dated to the middle of the medieval period (AD1240-1350). Most of the building material retrieved was also dated to the medieval period, dating to AD1240-1450. A residual piece of Roman tegula was also retained from the deposit.

Grey brown sandy clays [11] sealed deposit [10]. The upper horizon of [11] was 1.5m below the existing ground level. Hand inspection of [11] recorded some small fragments of brick and tile.

The upper part of the stratigraphic sequence was observed in section during the UXO clearance. Context [11] was overlain by made ground consisting of redeposited gravel to a depth of 0.4m. Above this was 0.7m depth of modern made ground consisting of compacted gravel and sandy silt mixed with demolition materials. This was sealed by 0.2m depth of asphalt type material. The overlying surface consisted of 0.1m depth of concrete supporting a path surface of similar depth.

3.3.3 BH3

BH3	
Location	North of NE corner of Tate
Dimensions	Trench 5m x 4m x 6-6.5m deep Borehole 1.2m-1.5m diameter
Modern ground level/top of slab	5.70m OD
Base of modern deposits	0.5m OD at highest
Depth of archaeological deposits seen	Alluvium only 1.6m deep
Level of base of deposits observed and/or base of borehole	-8.3 m OD
Natural observed	Sand and gravel -1.1m OD London Clay -5.3m OD

BH3 was dug by a small machine down to a depth of 2m after the hole had been enlarged to 1m x 1m due to the extent of obstruction. The position was then backfilled by contractors prior to an attempt at UXO probing, which was unsuccessful. A second attempt to remove obstructions was then made using a larger machine. The hole was expanded to 2.2m x 1m and dug to 4.4m below current

ground level. The horizon was then probed for UXO to a range of 2m i.e. to 6.5m below ground level, using a hand held probe.

The lorry mounted borehole machine was unable to bore through concrete footings and the trench was enlarged by a large machine to dimensions of 5m x 4m and a depth of 6.5m. Eventually contractors were able to successfully clear a borehole position at the west end of the trench.

London clay was recorded at an upper horizon 11.2m below the current ground level. Overlying this was 3.4m depth of natural sand and gravel.

The natural sand and gravel was sealed by 1.5m of dark blue grey alluvial clay [35]. The top of the alluvial sequence was completely truncated away by modern disturbance.

Most of the archaeological sequence had been removed by construction of modern foundations and structures. In the eastern part of the trench concrete foundations with thick reinforcing bar were still in evidence at over 6m below the current ground level. In the western end of the trench a concrete wall face was in evidence from 3.4m-5.2m down. A similar concrete face was also observed running east west along the northern face of the trench. These walls appeared to be covered with an asphalt roof. On the southern side of the trench an entrance or inlet appeared to be evident at the western end of the trench.

Modern dumping of brick, metal, wood and other demolition materials was observed at between circa 4m below ground level.

In the top of the hole a concrete and brick mix was located between 4m and 0.6m below ground level. This was overlain by 0.4m depth of compacted concrete with brick and gravel. The overlying pathway consisted of 0.1m depth of concrete beneath 0.1m depth of resin topped tarmac as elsewhere.

3.3.4 BH4

BH4	
Location	East of footbridge
Dimensions	Trial pit 3m x 0.8m x 4.3m deep Borehole 0.21m diameter x 14.5m deep
Modern ground level	5.39m OD
Base of modern deposits	3.00m OD
Depth of archaeological deposits seen	5.8m depth
Level of base of deposits observed and/or base of borehole	Base of borehole -9.1m OD
Natural observed	Sand and gravel -2.8m OD London clay -5.8m OD

BH4 was initially excavated to 1.2m below ground level using a small machine. At this stage the position measured 0.9m by 0.5m at the top. The position was then backfilled by contractors prior to an unsuccessful attempt at UXO probing. Contractors later returned to the position with a larger machine and expanded the hole to 3m x 0.8m x 4.3m deep. The position was then successfully probed using a hand held device.

A borehole of 0.21m diameter was excavated in the northern end of the trench. Archaeological deposits retained from the process were hand inspected and a small quantity of finds retrieved.

London Clay was observed at 11.2m below the current ground level. This was overlain by 3m of natural sands and gravels.

There was no survival in this borehole position of a clean alluvial sequence. The sands and gravels were overlain by 1.6m depth of disturbed alluvial clays [34] containing large fragments of wood, forming part of a possible medieval/post-medieval waterfront structure, as well as some animal bone and fragments of tile. These deposits were overlain by approximately 1m depth of clay silt deposits [30] containing oyster shell, animal bone, and fragments of building material including chalk lumps. Peg tile retrieved from the deposit was dated to a broad date range from the twelfth century onwards.

Overlying this was 1.3m depth of dumped deposits [29] containing a mixture of demolition materials and domestic waste. A small quantity of pottery was retrieved from this context which was dated to the late medieval to early post medieval period (AD1480-1650). These deposits were overlain in turn by a further 1m depth of similar dumped deposits [13]. This deposit contained food waste in the form of animal bone and remains of pig, cow and rabbit. Machine excavation of the upper part of the trench allowed hand inspection of retrieved deposits. The deposits contained large amounts of oyster and other shell, as well as animal bone and building materials. Most of the pottery retrieved from [13] was dated to the medieval period AD1350-1400 with a small amount of pottery dated to AD1670 onwards. The building material retained from the deposit was exclusively medieval in origin dating to the period AD1240-1350.

Layer [13] was sealed by a further 0.8m depth of dark grey brown sandy silt [12] including cessy material. These deposits contained fragments of brick as well as a small amount of pottery dated to AD1480-1650.

Three metal service pipes were observed at between 2m and 2.3m below the existing ground level in the south end of the hole. This meant that only the north end of the hole could not be fully excavated. Sandy silt made ground was identified in the top of the hole at an upper horizon 1.1m below the current ground level. This was overlain by 0.4m depth of loose crush with brick inclusions. Above this was 0.2m depth of brick and concrete overlain by 0.1m of gravel. This was sealed by 0.3m of rough gravelly concrete mix, beneath a slab of 0.1m thickness.

3.3.5 BH5

BH5	
Location	Southwest of western entrance
Dimensions	Borehole 0.40m diameter x 12m deep
Modern ground level	3.52m OD
Base of modern material	1.9m OD
Depth of archaeological deposits seen	2.1m depth Alluvium only
Level of base of deposits observed and/or base of borehole	-8.48m OD
Natural observed	Sand and gravel -0.18 London Clay -6.88m OD

UXO probing was not undertaken for BH5. The surface was broken out by borehole contractors to slightly larger than the borehole dimension prior to borehole excavation.

London Clay [57] was observed at 10.4m below ground level. This was lower than observed in the adjacent BH1. The London Clay was sealed by a thin horizon of sand and mud clay [39] of 0.1m depth, this was in turn sealed by a further 0.1m depth of sand and gravel with some clay content [40]. Above these deposits was 2.4m depth of sands and gravels [41] containing patches of medium to fairly large sized cobbles. These deposits were overlain by 3m depth of finer sands and gravels [42] with some clay content. The upper horizon of natural sands and gravels was at 3.7m below ground level.

Natural sands and gravels were sealed by 1.2m depth of pale grey alluvial sandy clay [43], which was in turn overlain by 0.9m depth of dark blue grey more weathered silty clay [44] with some fragments of oyster shell, some fish bone and some pea grit. The top of the alluvial sequence was recorded at 1.6m below the existing ground level. The alluvial sequence did contain some intrusive modern material, but this was thought to have probably derived from the boring process although some material may have sunk into underlying deposits.

Towards the top of the borehole a brick wall was revealed. This wall appeared to be of modern construction. The top of the wall was located 0.4m below ground level at 3.12m OD.

3.3.6 BH6

BH6	
Location	South of Millennium Bridge
Dimensions	Borehole 1.5m diameter x 13.35m deep Excavation hole 3.7m x 3.4m x 4m depth
Modern ground level	5.56m OD
Base of modern material	0.51m OD
Depth of archaeological deposits seen	1.25m
Level of base of deposits observed and/or base of borehole	-7.8m OD
Natural observed	Sand and gravel -0.73m OD London Clay -5.04

The borehole was initially excavated as a borehole only, but problems with obstructions necessitated the excavation of a large trench dug to 5m depth.

In the base of the borehole London Clay was recorded at 10.6m Below existing ground level, this was sealed by over 4m depth of sands and gravels. The upper horizon of these sands and gravels was 6.3m below the current ground level. This was a little higher than in BH3 and a lot higher than in BH4.

The sands and gravels were sealed by 1.25m depth of alluvial clay [58] containing oyster shell, animal bone and fragments of wood. As in BH4 no clean alluvial deposits were observed in this borehole. The layer can be attributed as probably equivalent to [34] in BH4 which is statigraphically no later than medieval in formation. The upper horizon of alluvial deposits was approximately 5m below the existing ground level.

The upper parts of the trench were disrupted by service cables located at 3.6m below ground level. On the southern side of the excavation a ceramic pipe was located 4.2m below ground level which began leaking viscous oil. This had to be isolated by putting in a metal box. The statigraphic sequence in the southern end of the borehole was somewhat obscured by services, but deposits overlying and immediately below these services contained some apparently residual post- medieval pottery and animal bone, which were not kept.

On the northern side of the excavated trench an east-west orientated brick wall [48] was located. This wall had a north-south orientated return in the north-eastern end of the trench. This wall was constructed of red brick bonded with a firm mortar and did not appear to be earlier than 19th century in construction. The top of the wall was located at 2.3m below ground level (3.26m OD). The wall could not be hand inspected but was approximately 0.6m wide. Demolition deposits [47] of brick rubble with sandy silt were dumped up against the northern face of the wall indicating a building extending northwards. The brick wall sat on top of concrete foundations which were partially broken out and removed. The wall was interpreted as not earlier than 19th century in construction.

A surface of 10mm thick tarmac overlying a mortar make-up of similar thickness was located at 2.1m below the existing ground level. This was overlain by 2mof compacted rough concrete with rubble. This was in turn overlain by the ground surface of tarmac with a gravel resin.

3.4 Assessment of the evaluation

GLAAS guidelines (English Heritage, 1998) require an assessment of the success of the evaluation 'in order to illustrate what level of confidence can be placed on the information which will provide the basis of the mitigation strategy'. In the case of this site the archaeological evaluation was able to provide a good assessment of the likely impact of the development proposals on surviving deposits and structures.

The evaluation and watching brief has provided a good profile of the natural landscape.

Borehole observations to the west and north of the site have provided a snapshot of the extent of survival in this area of the site. This has added further to information already known about the site as a result of both existing documentary evidence and the results of previous excavations.

4 Archaeological potential

4.1 Realisation of original research aims

- What was the level of natural topography?

In the evaluation trenches to the southwest of the site natural gravel was located at -0.55m OD in Trench A and -0.65m OD in Trench B. These sands and gravels were overlain by 2m depth of alluvial clay deposits.

In the borehole positions London Clay was observed to the west of the site in BH5 at -6.88m OD and in BH1 at -6.45m OD. In BH5 natural sand and gravels were observed at -0.18m OD and in BH1 at -0.75m OD. In this area of the site sands and gravels were overlain by between 1.8m and 2m depth of alluvial clays.

In BH3 in the Northeast part of the site London Clay was recorded at -5.3m OD with overlying sands and gravels at -1.1m OD. Most of the overlying alluvium was truncated by modern foundations.

To the northwest of this in BH6 natural deposits were observed at higher levels. London Clay was observed at -5.04m OD and sands and gravels were observed at -0.74m OD. This may be some indication of a northeast-southwest orientated channel running off the Thames.

To the north of the site London Clay was identified at -5.3m OD in BH2 and -5.8m OD in BH4. Sands and gravels were identified at -1.97m OD in BH2 and -2.8m OD in BH4.

Evidence from borehole positions in the northern part of the site reflect the downward slope of the topography towards the river Thames to the north. There was no survival of undisturbed alluvial deposits in this area of the site.

To the southwest of the site there appears to be a slight rise in natural levels from BH1 to BH5 to its south. The natural levels then appear to fall away again towards Trenches A and B which were the most southerly of the excavations.

Natural levels recorded during excavations at Hopton Street HLS08 were much higher than on this site with natural sands and gravels recorded at between 0.16m OD and 0.47m OD, This reflects the position of the Tate Modern site on the eastern edge of an eyot within the floodplain of the Thames. The slope in the natural from BH1 to BH5 is indicative of part of the eastern slope of the eyot. The decline in the level of natural sands and gravels from Trench A to Trench B is consistent with evidence from Hopton Street which also recorded a decline in natural levels to the south.

- What are the earliest deposits identified?

In BH2 1m of undated peat deposits were identified at the bottom of the sequence which may date to the prehistoric or later periods. A sherd of pottery was recovered from alluvial deposits in BH1 which could only be identified as either Roman or medieval in origin. The top of the alluvial sequence in Evaluation Trench B contained

a single sherd of medieval pottery dated to the late 13th century onwards. Earliest deposits overlying natural gravels in BH2 contained a fragment of Roman building material. Artefacutal evidence was recovered from a deposit in BH2 which dated to AD 1240-1350. A possible waterfront structure identified in BH4 aligns closely with waterfront 4 identified in the Millennium Bridge excavations (MFB98). Waterfront 4 was dated to the 13th-14th centuries. In the evaluation trenches in the southern part of the site earliest dumped deposits dated to the mid 17th century although some residual medieval pottery was present.

- What are the latest deposits identified?

Later post medieval deposits survive over most of the site. In Trench A, a large amount of artefactual evidence was recovered which dated to the early 20th century. There was also survival of brick structures in the evaluation trenches. These appear to date to the 18th-19th century.

4.2 General discussion of potential

4.2.1 Geoarchaeological potential

The site has good potential for the further understanding of the geology and topography of an area immediately to the south of the Thames. Southwark is an area where the local topography is of particular significance in determining landuse from the prehistoric and Roman periods onwards. These excavations have been able to provide a good profile of the natural landscape see Fig 7. There is some indication of the edge of the slope of the eyot on the west side of the site as well as clear indication of the slope from north to south towards the Thames foreshore.

4.2.2 Prehistoric

In the south-western area of the site no evidence was found for prehistoric deposits in either of the evaluation trenches. Neither was any evidence found for deposits in BH1 and BH5 to the west of the site. However previous excavations at Hopton Street and Holland Street have identified evidence for a Neolithic or Bronze Age land surface sealed by alluvium so given that the alluvial deposits were in all cases mostly hand-augered or excavated as boreholes prehistoric survival in this area cannot completely be ruled out.

In BH2 to the northwest of the Tate Modern an undated peat horizon was identified which may be prehistoric or later in date.

4.2.3 Roman

No clear evidence was found for Roman deposits during the evaluation, Excavation of BH1 to the west of the ramped entrance to the Tate Modern located an abraded sherd of pottery which could only be identified as either Roman or medieval in origin.

Further evidence for the Roman period was located in BH2 to the northwest of the Tate Modern, where Roman building material was located within deposits overlying the natural gravel. These deposits contained large fragments of wood. This would suggest the survival of residual Roman material within a later structure. A piece of Roman tegula was also recovered from a medieval context within the same borehole.

4.2.4 Medieval

In evaluation Trench B medieval pottery was retrieved from deposits at the top of the alluvial sequence. Some residual medieval pottery was also retrieved from later post-medieval deposits in the same trench.

The area to the north of the Tate Modern has very good potential for the survival of medieval deposits and waterfront structures. Previous excavations in this area prior to the construction of the Millennium Bridge have identified remains of waterfront structures dating back to as early as the twelfth century. The results of the borehole excavations have provided further confirmation of this potential.

In BH2 deposits dating to the mid 13th to 14th century were identified overlying deposits containing remains of timber. In BH4 immediately to the east of the Millennium Bridge dumped deposits containing pottery dated to the second half of the 14th century overlay an earlier sequence of disturbed alluvial deposits containing remains of timber.

4.2.5 Post-medieval

The potential for the survival of post-medieval deposits and structures is good throughout all areas of the site which do not have deep truncation from modern buildings.

In the evaluation trenches dumped deposits dating to the 17th century were identified in both trenches.

There is some potential for the recovery of industrial material dating to the period. A piece of crucible used in the manufacture of glass was recovered from Trench A. Glass manufacture is indicated on Rocque's map of 1748 with Glasshouse Yard indicated to the east. Kiln furniture used in the production of 17th/18th century pottery was also recovered from Trench A. A large amount of ginger beer bottles dating to the early 20th century were recovered from Trench A.

There was survival in both evaluation trenches of post-medieval brick structures dating to the late 18th to 19th centuries. In Trench A large amounts of artefactual evidence from the early 20th century were retrieved. This material is of some interest in terms of the development of local industry.

Three of the boreholes BH1, BH2 and BH4 contained dumped deposits dating from the late 15th century onwards. Previous excavations have demonstrated good potential for the survival of post medieval waterfront structures.

4.3 Significance

Whilst the archaeological remains are undoubtedly of local significance there is nothing to suggest that they are of regional or national importance. Of particular interest are the survival of undated peat deposits at the bottom of the sequence on the northwest side of the site and indications of the survival of waterfront structures and deposits, dating from the medieval to early post-medieval periods. Evidence from alluvial horizons on the western side of the site is of local interest in terms of the potential to add to our understanding of the early development of this part of Southwark. The survival of 16th to17th century horizontal stratigraphy is of local interest in view of the suburban development of the south bank of the Thames during this period.

5 Assessment by EH criteria

The recommendations of the GLAAS 1998 guidelines on *Evaluation reports* suggest that there should be:

'Assessment of results against original expectations (using criteria for assessing national importance of period, relative completeness, condition, rarity and group value) .....' (Guidance Paper V, 4 7)

A set of guide lines was published by the Department of the Environment with criteria by which to measure the importance of individual monuments for possible Scheduling. These criteria are as follows: *Period*; *Rarity*; *Documentation*; *Survival/Condition*; *Fragility/Vulnerability*; *Diversity*; and *Potential*. The guide lines stresses that 'these criteria should not...be regarded as definitive; rather they are indicators which contribute to a wider judgement based on the individual circumstances of a case'.[1]

In the following passages the potential archaeological survival described in the initial Assessment document and Section 3.2 above will be assessed against these criteria.

Criterion 1: period
Taken as a whole, archaeology in the Application site is not characteristic of one particular period. The Evaluation indicates a multi period site with archaeological survival from possibly as early the Bronze Age to the later post-medieval period.

Criterion 2: rarity
There is nothing to suggest that any of the likely archaeological deposits are rare either in a national or regional context.

Criterion 3: documentation
There are no surviving documentary records for remains in the area from the Roman period. Whilst there may be considerable contemporary documentation for the later medieval period from *c* 1300 on, the truncated and fragmentary nature of archaeological remains from this period will render most of this information unusable/ it is unlikely that any documentation prior to the later post-medieval period will be specific enough to relate to individual features and deposits found on the site.

Criterion 4: group value
None of the likely archaeological deposits are associated with contemporary single Monuments external to the site.

Criterion 5: survival/condition
The evaluation and watching brief have demonstrated that archaeological remains will be horizontally truncated to dramatically different levels throughout the site. In most severely truncated areas of the site all archaeological evidence prior to alluvial inundation over gravels had been completely truncated away. In other areas of the site a complete sequence from the natural landscape to the later post-medieval period survived on the site. In the least truncated areas of the site archaeological deposits and structures survive on good condition.

[1] Annex 4, DOE, Planning and Policy Guidance 16, (1990). For detailed definition of the criteria see that document. Reference has also been made to Darvill, Saunders & Startin, (1987); and McGill, (1995)

Criterion 6: fragility
Experience from other sites has shown that isolated and exposed blocks of stratigraphy can be vulnerable to damage during construction work. The proposed development will destroy and remove archaeological evidence in specific areas of the site.

Criterion 7: diversity
Clearly, taken as a whole, the archaeological deposits which are likely to be found in the site represent a diverse and heterogeneous group of archaeological remains of all types and periods. However, this diversity is in itself the product of a random process of vertical and horizontal truncation and separation. There is no reason to suggest that the diversity *per se* has any particular value which ought to be protected.

Criterion 8: potential

Excavations have established a good indication of the profile of the surviving natural landscape. To the west of the site there was indication of survival of undated peat deposits which may date to the prehistoric period or later. Finds retrieval from alluvial deposits suggested some evidence of activity in the vicinity during the Roman period. There was also good evidence for the potential survival of deposits and structures from the medieval to early post-medieval period. Waterfront structures dating back to as early as the twelfth century are known to survive on the site. There is extensive survival of deposits and structures from the later post-medieval period over most of the site.

6 Proposed development impact and recommendations

The proposed redevelopment at Tate Modern involves the construction of a new second Tate Modern building which will require large pile caps. In addition borehole excavations have been undertaken in order to assess the potential for a new geothermal water system.

The archaeological evaluation in the south-western part of the site has demonstrated that proposed pile positions and any other deep excavations/groundworks in this area of the site would remove archaeological deposits of only local interest, containing artefactual material dating from the medieval to post-medieval periods. Proposed pile positions would remove all alluvial deposition, deposits dating to the 17th century and structures and deposits dating from the 18th century onwards. Archaeological monitoring in the form of a watching brief may be appropriate for any further works such as pile probing in this area of the site.

The watching brief on borehole positions to the west and north of the Tate Modern has established that in most areas between 3m and 6m of archaeological deposits, of only local interest, survive in these areas of the site.

In the area of BH1, any groundworks of over 3m depth would remove alluvial deposits, from which a sherd of pottery dating to the Roman or medieval period was retrieved in the watching brief.

Over most of the area covered by the boreholes any groundworks or excavation below between 1.2m-2m below ground level has the potential to remove archaeological deposits from the later post medieval period. Any deeper excavations below 3m to the north of the Tate Modern have the potential to remove and destroy deposits and waterfront structures dating from the early medieval period onwards. Previous excavations in this area have suggested that the earliest of these structures may date back to the 12th century.

Deep excavations down to natural deposits on the northwest side of the site have the potential to remove undated peat deposits, overlying horizontal stratigraphy and remains of timber structures dating to the medieval to post-medieval periods.

It is recommended that further archaeological monitoring may be appropriate for any deep groundworks in less truncated areas to the west of the Tate Modern.

Any further deep groundworks in the area to the north of the Tate Modern (away from the modern foundations and services such as experienced in BH3 and BH6) may require particular attention especially any works deep enough to destroy and remove medieval and early post-medieval waterfront deposits and structures. The nature of any further archaeological work in this area should be dependent on the extent of works involved, but the minimum requirement should be an archaeological watching brief.

The decision on the appropriate archaeological response to the deposits revealed within the evaluation and watching brief rests with the Local Planning Authority and their designated archaeological advisor.

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9 NMR OASIS archaeological report form

9.1 OASIS ID: molas1-61926

Project details

Project name	Transforming Tate Modern, Bankside, London SE1
Short description of the project	Prior to construction of Tate Modern 2 an archaeological evaluation was conducted on the site consisting of two evaluation trenches in proposed pile positions. In addition a watching brief was maintained on borehole positions excavated in order to look at the water table with a view to the construction of a new geothermal system for the heating and cooling of the new buildings. Initial results suggest survival of deposits and structures from the Roman to post medieval periods. There was also some survival of peaty clay deposits possibly prehistoric in origin.
Project dates	Start: 20-04-2009 End: 17-07-2009
Previous/future work	Yes / Not known
Any associated project reference codes	TMB09 - Sitecode
Type of project	Field evaluation
Site status	Conservation Area
Site status (other)	Archaeological priority zone
Current Land use	Community Service 2 - Leisure and recreational buildings
Monument type	WALL Post Medieval
Monument type	WELL Post Medieval
Monument type	REVETMENT Medieval
Significant Finds	POT Roman
Significant Finds	POT Post Medieval

Significant Finds	GLASS Post Medieval
Methods & techniques	'Augering','Targeted Trenches'
Development type	Art Gallery
Prompt	Direction from Local Planning Authority - PPG16
Position in the planning process	After full determination (eg. As a condition)

Project location

Country	England
Site location	GREATER LONDON SOUTHWARK SOUTHWARK Tate Modern, Bankside, London SE1
Postcode	SE1 9TG
Study area	1.00 Kilometres
Site coordinates	TQ 531925 180390 50.9408398465 0.180722322901 50 56 27 N 000 10 50 E Point
Height OD / Depth	Min: -6.88m Max: -0.55m

Project creators

Name of Organisation	MoL Archaeology
Project brief originator	London borough of Southwark
Project design originator	MoL Archaeology
Project director/manager	Derek Seeley
Project supervisor	Andrew Daykin
Type of sponsor/funding	Mills Whipp Projects on behalf of The Board of Trustees of the Tate Gallery

body

Project archives

Physical Archive recipient	LAARC
Physical Contents	'Animal Bones','Ceramics','Environmental','Glass','Metal','Worked stone/lithics'
Digital Archive recipient	LAARC
Digital Contents	'Animal Bones','Ceramics','Environmental','Glass','Metal','Worked stone/lithics'
Digital Media available	'GIS','Survey'
Paper Archive recipient	LAARC
Paper Contents	'Animal Bones','Ceramics','Environmental','Glass','Metal','Survey','Worked stone/lithics'
Paper Media available	'Context sheet','Correspondence','Diary','Drawing','Matrices','Photograph','Plan','Report','Section','Survey','Unpublished Text'

Project bibliography 1

Publication type	Grey literature (unpublished document/manuscript)
Title	Transforming Tate Modern, Bankside, London SE1, A report on the evaluation and watching brief
Author(s)/Editor(s)	Daykin A
Date	2009
Issuer or publisher	MoL Archaeology
Place of issue or publication	MoL Archaeology

Description	Standard evaluation report
Entered by	ADaykin (adaykin@museumof london.org.uk)
Entered on	13 July 2009

10 Medieval and post-medieval pottery assessment

By Nigel Jefffries

10.1 Summary Quantification and assessment

10.1.1 Site archive: finds and environmental, quantification and description

Table 1: Finds and environmental general summary

Medieval pottery	32 sherds. Total 0.4kg
Post-medieval pottery	215 sherds. Total 9.1kg

10.1.2 The pottery

Table 2: Pottery

Post-Roman pottery	9.5kg	249 sherds

10.1.2.1 Medieval pottery (c 900–1500)

10.1.2.1.1 INTRODUCTION

This text considers the medieval pottery present in five of the 13 contexts with pottery from the archaeological evaluation at TMB09. Comprising just 32 sherds from 23 vessels (ENV) and weighing a total of 247 grammes, Table 3 demonstrates a relatively even chronological spread of 13th-14th–century activity (as measured by sherd count by context). However, with all of this material from small-sized groups (contexts containing between one and 29 sherds) and some apparently residual - medieval pottery was found mixed with post-medieval dated pottery in contexts [12] and [28] - its further potential and significance remains limited. Table 4 helps define the condition of this assemblage, which demonstrates that as an average, there are low number of sherds, vessels and overall weight present per context.

Table 3: Medieval pottery by statistical averages per context

No. of contexts	Total no. of sherds/ENV	Average no. of sherds (per context)	Average no. of vessels (per context)	Average pottery weight (per context)
5	32/23	6.4	4.6	85.4 grammes

Most of the medieval pottery was found from just one context [13] (24 sherds), though it should be noted that two sherds of post-medieval pottery are also present.

10.1.2.1.2 METHODOLOGY

The medieval pottery from this site was examined macroscopically, using a binocular microscope (x 20) where appropriate, and recorded on paper and computer, using standard Museum of London codes for fabrics, forms and decoration. The numerical data comprises sherd count (SC), estimated number of vessels (ENV) and weight (by grammes) and was entered onto the ORACLE database.

10.1.2.1.3 FABRICS AND FORMS

This section considers the fabrics found with Table 4 (below) dividing the medieval pottery into the three following categories by ware type: local glazed wheel-thrown wares, Surrey whitewares and wheel-thrown coarsewares.

Table 4: Ware types for the medieval pottery found from TMB09 by sherd count, ENV and weight

Ware type	No of sherds	No of sherds as %	ENV total	ENV total as %	Weight (in grammes)	Weight (as %)
Local wheel-thrown glazed wares	6	18.8%	6	26.1%	94	26.1%
Surrey whitewares	25	78.1%	16	69.6%	293	68.6%
Wheel-thrown coarsewares	1	3.1%	1	4.3%	40	9.4%
Total	32	100%	23	100%	427	100%

The medieval pottery from this site is dominated by Surrey whitewares which in turn has implications for the chronology of the recorded landuse. Providing 25 sherds or 78.1% of the total medieval assemblage, the Surrey whitewares found in this context are predominantly Kingston-type (KING) and coarse border wares (CBW). Representing the early 13th-century product of this industry, the most frequent fabric is Kingston-type ware (KING), a white-fired, wheel-thrown, sandy earthenware and one of the main types of pottery used and found in London during the medieval period (Pearce and Vince 1988, 6). When no rim is present to determine precise form, and the bases/lower profiles of vessels have only survived, those internally glazed examples of KING have been recorded as bowls/dishes, or when sooted, as jars/cooking pots. Characterised by a hard, coarse, sandy, buff-coloured body and far less use of glaze or decoration, CBW was ideal for kitchen and storage vessels and was made in a wide range of forms, and is therefore important in defining any mid to late 14th–century landuse applied. Though the later variants of the Surrey whiteware industry, Cheam whiteware (CHEA), is represented by just the one sherd in this context, it is responsible for the mid 14th–century date applied to context [13].

10.1.2.1.4 DISCUSSION

The statistical information presented in Table 5 displays the *terminus post-quem* and *ante-quem* dates per context by sherd count for the medieval pottery. Though this material is dated between *c* 1240 and 1500, the table displays a clear cluster, with late 13th and 14th–century dated pottery dominating this sequence, largely reflecting the ware type and fabric composition of context [13].

Table 5: Terminus post-quem and ante-quem dates of contexts with medieval pottery by sherd count

	TAQ			
TPQ	1350	1400	1500	Grand Total
1240	5			5
1270	2		1	3
1350		24		24
Grand Total	7	24	1	32

10.1.2.1.5 ASSESSMENT WORK OUTSTANDING

There is no outstanding assessment work.

10.1.2.2 Post-medieval (c 1500–1900)

10.1.2.2.1 SUMMARY/INTRODUCTION

This text considers the post-medieval pottery retrieved in 11 contexts ([1], [12], [13], [15], [16], [17], [20], [24], [25], [28], and [29]) from the archaeological evaluation at TMB09. It evaluates the character and the date range of the assemblage, determines the research questions this material can address while identifying areas of further work. Comprising 217 sherds from 134 vessels and weighing a total of 9160 grammes, most of the pottery was retrieved in contexts [15] and [16], both of which contained medium-sized pottery groups (contexts yielding between 30 and 99 sherds) that supply 147 sherds and 77 vessels.

Table 6: Post-medieval pottery by statistical averages per context

No. of contexts	Total no. of sherds/ENV	Average no. of sherds (per context)	Average no. of vessels (per context)	Average pottery weight (per context)
11	217/134	19.5	12.1	832 grammes

Table 7 presents an assemblage that was retrieved in a relatively good condition, with the high total weight of pottery per context (832 grammes) reflecting the quantities of early 20th–century dated stoneware ginger beer bottles found in contexts [15] and [16] (which contained reconstructable profiles and large-cross joining sherds). Larger sized sherds and/or cross-joining vessels are otherwise represented in contexts [1] and [17], with the remainder of the contexts with post-medieval pottery characterised by fragmented rim, bases and body sherds.

10.1.2.2.2 METHODOLOGY

The post-medieval pottery was recorded to the same standards as the medieval pottery.

10.1.2.2.3 FABRICS AND FORMS

Table 7 demonstrates that the post-medieval pottery found can be broken up into nine categories by broad sources of supply: British made stonewares. Essex made 'fine' red earthenwares, imported wares (Continental), industrial finewares, London made 'coarse' red earthenwares, London made tin-glazed wares, non local earthenwares, and Surrey-Hampshire border wares.

Table 7: Ware types for the post-medieval pottery found from MCF06 by sherd count, ENV and weight

Ware type	No of sherds	No of sherds as %	ENV total	ENV total as %	Weight (in grammes)	Weight (as %)
British made stonewares	125	57.6%	51	38.1%	5572	60.8%
Essex made 'fine' red earthnwares	5	2.3%	5	3.7%	166	1.8%
Imported wares: Continental	2	0.9%	2	1.5%	58	0.6%
Non local earthenwares	3	1.4%	2	1.5%	200	2.2%
Industrial finewares	7	3.2%	7	5.2%	46	0.5%
London made 'coarse' red earthenwares	28	12.9%	27	20.1%	1530	16.7%
London made tin-glazed wares	20	9.2%	17	12.7%	570	6.2%
Kiln furniture	1	0.5%	1	0.7%	41	0.4%

Ware type	No of sherds	No of sherds as %	ENV total	ENV total as %	Weight (in grammes)	Weight (as %)
Surrey-Hampshire	26	12%	22	16.4%	977	10.7%
Border wares						
Total	217	100%	134	100%	9160	100%

Though much of this material is derived from just two contexts ([15] and [16]) and is dated to the early 20th century, the remaining pottery from [1], [12], [17], [20], [24], [25], [28], and [29] supplying a generally consistent 17th–century date to the landuse from which it was found. The 17th–century dated contexts are largely characterised by Surrey-Hampshire border wares, London made tin-glazed wares and coarse red earthenwares and supplemented by Continental imports. Most common among these groups are the either undecorated (PMRE) or slipped (PMSRG and PMSRY) decorated products of London red earthenware industry. Made in production centres located on the south bank of the Thames, notably at Woolwich, these are often found here in carinated bowls and dish forms.

Another common ware type to this site are the developed white- and red Surrey-Hampshire border wares first made in the mid 16th century, and which came to play a major part in London's pottery supply between c 1550 and 1700. The whitewares in 16th-century contexts have either clear or green glaze (BORDY and BORDG), and greatly outnumber redwares (RBOR) made at the same centres at this date. The border industry was one of the most versatile in southern England during the early post-medieval period, producing a considerable number of different vessel forms suitable for a very wide range of domestic functions. Among the better preserved examples retrieved is the profile and handle from a bedpan in RBOR from [17], though much of the remainder of these wares more fragmented, often base sherds, largely identified as dishes and porringers.

London made tin-glazed wares are largely represented by early to mid 17th–century decorated examples (TGW A and TGW D) with plain undecorated wares (TGW BLUE) also present. The best surviving examples are the complete base and lower profile of a large-sized mid 17th–century cylindrical jar blue painted decoration from context [17] and the charger from context [25] decorated with the 'daisy pattern' (Noël Hume 1977, 47) and an external clear lead glaze (TGW A). Perhaps surprisingly, given this particular sites Bankside location and its once close proximity to a number of tin-glazed ware pothouses, is the near absence of factory waste and biscuit wares from this industry.

However, what characterises this pottery assemblage is the large quantity of early 20th–century English stonewares derived from contexts [15] and [16]. Indeed, such is the similarity in dating and composition of this material is that any chronological differences that might have been inferred between these contexts can now be discounted. The vast majority of the forms are ginger beer bottles with either cork, internal screw, or crown corked closures. The only variation is the small hole incorporated into the lip of a ginger beer bottle from [16] identified by Askey (1998, 87) as a Gatlee More closure. The only other difference in form and closure are the three Bristol glazed stout bottles from [16] with crown cap closures. Overall, dating for both contexts is provided by the manufacturing stamps belonging to either Lovatt & Lovatt and Bourne & Eastwood: here the presence of two numerals reading 02, 05 and 07 on three examples relates to practice of marking the year of manufacture during the first half of the 20th century (ibid 75). The majority of the bottles have black printed retailer labels (1870s plus) with the most common derived from one C Butcher of Chatham, though other identifiable labels include ginger beer made by Francis Drake of New Glasgow, Nova Scotia (Canada) and the lower profiles from

two bottles from a Rochester based retailer (thought to be the Rochester in Kent rather than Canada) which have the figure bust of a female present.

10.1.2.2.4 DISCUSSION

Table 8 demonstrates that whilst contexts with post-medieval pottery are dated *c* 1480–1930 most of the sequence is clustered either to the 17th or early 20th century. Within the earliest *c* 1480–1650 sequence are examples of the London made 'coarse' red earthenware category. Only contexts [15] and [16] which contained the ginger beer bottles provide the potential for further analysis.

Table 8: Terminus post-quem and ante-quem dates of contexts with post-medieval pottery by sherd count

	TAQ					Total	Total
TPQ	1650	1680	1700	1900	1930		
1480	2					2	2
1600				2		2	2
1630	33	19	12			64	64
1670				2		2	
1907					147	147	
Total	35	19	12	4	147	217	

10.2 Analysis of potential

10.2.1 Pottery

This site provided an informative 17th–century post-medieval pottery assemblage, material that can be considered as being representative of the condition and chronologies of the ceramics that might be found in any future excavations within the footprint of this development (and in its immediate environs).

The part of the assemblage with the greatest potential is the group of ginger beer bottles from contexts [15] and [16]. Related to landuse from just one specific location from this site, this material, usually the focus of unscientific collecting and study by bottle and glass collectors, might have once been part of a larger dump of material from a nearby commercial premises, for example a public house, where ginger beer was often consumed, or from a mineral water manufacturer. The value of these good, closely datable groups lies in the light it can throw on the history and development of the site itself and of occupation in the area.

10.3 Bibliography

Askey, D, 1998 (1981) *Stoneware Bottles*, second edition, BBR publishing

Noël Hume, I, 1977 *Early English Delftware from London and Virginia*, Colonial Williamsburg, Occasional Papers in Archaeology, Volume II

Pearce, J, and Vince, A G, 1988 A Dated Type-series of London Medieval Pottery Part 4: Surrey Whitewares, *London and Middlesex Archaeol Soc Spec Pap 10*

11 Clay tobacco pipe summary

By Tony Grey

11.1 Introduction

The clay tobacco pipes from TMB09 were recorded in accordance with current MoLA practice and entered onto the Oracle database. The pipe bowls were classified and dated according to the Chronology of London Bowl Types (Atkinson and Oswald 1969) with the dating of some of the 18th-century pipes refined where appropriate by reference to the Simplified General Typology (Oswald 1975, 37-41). The prefixes AO and OS are used to indicate which typology has been applied. Quantification and recording follow guidelines set out by Higgins and Davey (1994; Davey 1997). A total of thirty-seven clay pipe fragments were recovered during bore hole and evaluation trench probing at Bankside near Tate Modern in early June 2009. This total comprised seven bowls (two accessioned as marked) and thirty stems. The assemblage was fragmentary and stained.

11.2 The Assemblage

Each context with pipe fragments (from Bore Hole 1) yielded datable pipe bowls. Context [1] yielded a single type AO22 dated 1680-1710 and ten stems. Context [15] yielded a residual type AO15 (1660-80) and a residual AO18 (1680-1710) <1> marked AA for either Anthony Andrews (Arthur) 1694-1716 or Anthony Atkinson 1696. The context was pipe dated 1700-40 by two type OS10 bowls with <2> marked ....B. Eighteen stems were also present. Context [25] yielded a residual AO9 pipe dated 1640-60 and an AO15 dated 1660-80 plus two stems.

11.3 Conclusion

The clay pipes recovered from the watching brief range in date from 1640-1740. All were smoked and most were broken and stained. None were burnished and so not of a high quality. They appear to be products of local London makers.

11.4 Bibliography

Atkinson, D R and Oswald, A, 1969 London clay tobacco pipes, *J British Archaeol Assoc* 32, 171-227

Davey, P 1997 *Clay pipes from Bolsover church*, unpub archive rep

Higgins, D A and Davey, P 1994 *Draft guidelines for using the clay tobacco pipe record sheets*, unpub report

Oswald, A, 1975 *Clay pipes for the archaeologist*, BAR 14, Oxford

12 Animal Bone assessment

By Alan Pipe

12.1 Quantification and evaluation

12.1.1 Site archive: finds and environmental, quantification and description

Table 9:Finds and environmental archive general summary

Animal bone	estimated 61 fragments. Total 1.130 kg.

12.1.2 Animal bone

Table 10: Contents of animal bone archive

	Weight (g)	No. fragments	No. boxes
Animal bone (hand-collected)	1055	36	1 standard archive box
Animal bone (wet-sieved)	75	25	1 standard archive box

12.1.2.1 Introduction/methodology

This report identifies, quantifies and interprets the animal bone from contexts [1] – [30], derived from hand-collection and wet-sieving. Hand-collected animal bone from [1] – [30] and wet-sieved animal bone from sample [20] {1} was recorded directly onto Excel spreadsheets in terms of weight (kg), estimated fragment count, species, carcase-part, fragmentation, preservation, modification, and the recovery of epiphyses, mandibular tooth rows, measurable bones, complete long bones, and sub-adult age groups. The assemblage was not recorded as individual fragments or identified to skeletal element. All identifications referred to the MOLA reference collection; and Schmid 1972. Fragments not identifiable to species or genus level were generally allocated to an approximate category, 'ox-sized' or 'sheep-sized', as appropriate. Each context and sample assemblage was then grouped with available dating and feature description.

12.1.2.1.1 SUMMARY, POST-MEDIEVAL

This assemblage provided 1.130 kg, estimated 61 fragments, of well-preserved hand-collected and wet-sieved animal bone with a minimum fragment size generally between 25 and 75 mm. The hand-collected bone produced 1.055 kg, estimated 36 fragments; the wet-sieved assemblage produced 0.075 kg, estimated 25 fragments. The bulk of the hand-collected bone derived from adult ox *Bos taurus*, ox-sized, adult sheep/goat *Ovis aries/Capra hircus* and 'sheep-sized' fragments, with occasional recovery of pig *Sus scrofa* lower limb from [7], adult head and juvenile lower limb from [13]; and a fragment of adult rabbit *Oryctolagus cuniculus* lower limb from [13]. Wet-sieved sample [20] {1} produced ox tooth, ox-sized rib and vertebra and fragments of sheep-sized head, rib and longbone.

There was no recovery of fish, amphibian, poultry, wild bird or human bone. Wild, 'game', species were represented only by rabbit lower limb from [13]. Most of the assemblage derived from adult animals with a juvenile pig lower limb and two infant calf mandibles (lower jaws) from [13].

The major domesticates were represented by elements of the head, vertebra/rib, upper limb and lower limb, mainly areas of moderate and good meat-bearing quality, with little recovery of poor meat-quality areas e.g. feet and no recovery of horncore. Clear evidence of butchery was seen on ox, ox-sized and sheep/goat only. A single fragment of sheep-sized head from sample [20] {1} had been calcined. There was no evidence of working, gnawing, pathological change or any other modification.
The group produced some evidence for age at death of the major domesticates with two mandibular tooth rows and seven epiphyses; metrical evidence comprised only two measurable bones with no complete longbones.

Table 11:Hand collected context groups weight preservation and type

Context	SAMPLE	Weight (kg)	FRAG (mm)	PRES	NOS	LMAM	MAND	MEAS	EPI
1	0	0.2	>75	medium	8	8	0	1	2
7	0	0.03	25-75	good	1	1	0	0	2
10	0	0.02	25-75	good	1	1	0	0	0
13	0	0.8	>75	good	25	25	2	1	4
20	1	0.075	25-75	good	25	25	0	0	0
30	0	0.005	25-75	good	1	1	0	0	0
TOTAL		**1.13**			**61**	**61**	**2**	**2**	**7**

12.1.2.1.2 ASSESSMENT WORK OUTSTANDING

There is no outstanding assessment work.

12.2 Analysis of potential

12.2.1 Animal bone

This small but well-preserved hand-collected and wet-sieved assemblage has some limited potential for further study of local meat diet and patterns of waste disposal, particularly with reference to carcass-part selection and age at death of the major domesticates; cattle, sheep/goat and pig, and butchery of cattle and sheep/goat. There is no evidence for the consumption of fish, poultry or game birds; in view of the absence of amphibians and small mammals from the samples, there is no potential for interpretation of local habitats.

Table 12: Hand collected context groups bycontext, sample, taxon, part,age and modification

INTERP	CON No	SAMPLE No	TAXON	PART	AGE	MODIFIED
MU	1	0	ox-sized	rib		butchery
MU	1	0	sheep/goat	lower limb	adult	
MU	1	0	sheep/goat	foot	adult	
MU	1	0	ox	foot		
EU	7	0	pig	lower limb		
EU	10	0	ox-sized	rib		
	13	0	ox	head	adult	
	13	0	ox	upper limb	adult	butchery
	13	0	ox	head	infant	
	13	0	ox	lower limb		butchery
	13	0	ox-sized	rib		butchery
	13	0	sheep/goat	lower limb		butchery
	13	0	sheep/goat	upper limb		
	13	0	sheep/goat	head		
	13	0	sheep-sized	rib		
	13	0	rabbit	lower limb	adult	
	13	0	pig	head	adult	
	13	0	pig	lower limb	juvenile	
	20	1	ox-sized	rib		butchery
	20	1	ox	tooth	adult	
	20	1	ox-sized	vertebra, thoracic		
	20	1	sheep-sized	rib		
	20	1	sheep-sized	longbone		
	20	1	sheep-sized	head		calcined
	30	0	sheep-sized	rib		

12.3 Significance of the data

12.3.1 Animal bone

The hand-collected and wet-sieved animal bone is of limited local significance only, particularly in terms of meat diet, with emphasis on the skeletal representation and age-selection of cattle, sheep/goat and pig and, to a lesser extent, rabbit.
There is no wider significance or significance in terms of local habitats.
8.

12.4 Bibliography

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13 Building materials assessment

By Stephen White

13.1 Summary Note on Building Materials

A total of 28 fragments of building material were recovered from TMB09 (contexts [7], [10], [13], [18], [30]). These comprised of 24 peg tile fragments, 1 brick, 1 piece of slate roofing, and 2 pieces of reused Roman tile.

The building material from TMB09 has been fully recorded and the information added to the Oracle database.

Table 13:Summary of the building material by context

Context	Fabric	Type	Date
[7]	2815	?	50–160
[10]	2271	Peg Tile	1180–1800
	2273	Peg Tile	1120–1220
	2586	Peg Tile	1150–1800
	2587	Peg Tile	1240–1450
	2815	Tegula	50–160
	3115	Stone Roofing	300–1900
[13]	2271	Peg Tile	1180–1800
	2586	Peg Tile	1150–1800
	2587	Peg Tile	1240–1450
[18]	3032	Brick	1750–1900
[30]	2271	Peg Tile	1180–1800
	2586	Peg Tile	1150–1800

13.2 Discussion

The building materials fabrics and forms for TMB09 give a medieval to post-medieval date. Fabrics 2271 and 2586 are hard to date exactly, as they were in use from the mid/late 12th century through to the end of the 18th. However, they are found associated with some quite definitely medieval tile fabrics which may indicate a late medieval date for these particular fragments. The single brick from context [18] of fabric 3032 had sharp edges, which allows an accurate date of 1750–1900. The building materials seem to be in keeping with the accelerated development of the area around the site during the medieval and post-medieval periods

14 Environmental sample assessment

By Anne Davis

14.1 Quantification and assessment

14.1.1 Site archive: finds and environmental, quantification and description

Table 14: Finds and environmental archive general summary

Bulk soil samples	Dry flot from 1 sample

14.1.1.1 The botanical samples

14.1.1.1.1 INTRODUCTION/METHODOLOGY

One 20 litre soil sample was taken from context [20], probably dating to the post-medieval period.

The sample was processed by flotation using a modified Siraf flotation tank with meshes of 0.25mm and 1:00mm to catch the flot and residue respectively. Both residue and flot were dried, and the former sorted by eye for artefacts and environmental material. The flot was scanned briefly, using a low-powered binocular microscope, and the abundance, diversity and nature of plant macrofossils and any faunal or artefactual remains were recorded on the MoLA Oracle database. Table 15 summarises the botanical data from the samples.

14.1.1.1.2 CHARRED REMAINS

Charred remains consisted only of occasional fragments of wood charcoal.

14.1.1.1.3 MINERALISED REMAINS

Occasional small fragments of wood appeared to be partially mineralised.

14.1.1.1.4 WATERLOGGED REMAINS

Organic remains were rare in the sample, but occasional fig (*Ficus carica*) pips and several seeds of wild plants were seen. The latter all came from common plants of waste and disturbed ground habitats.

14.1.1.1.5 FAUNAL REMAINS

A number of large mammal bones were extracted from the sample residue.

14.1.1.1.6 ARTEFACTUAL REMAINS

The sample consisted almost entirely of clinker, with occasional coal and slag particles. Occasional pot, glass, ceramic building material and iron objects were also included.

14.1.1.1.7 ASSESSMENT WORK OUTSTANDING

None.

14.2 Analysis of potential

14.2.1 Botanical samples

The plant assemblage found in the sample was very small and consisted of only a few seeds of common disturbed-ground taxa. These have no potential to assist in the interpretation of the site and no further work is recommended.

14.3 Significance of the data

The plant remains are of no particular significance.

14.4 Revised research aims

None.

14.5 Method statements

No further work is recommended.

Table 15: Summary of botanical assessment data

A: abundance, D: diversity (1 = occasional, 2 = moderate, 3 = abundant)

					chd wood	wlg seed	min misc	
Context	**Sample**	**proc vol(l)**	**flot vol**	**Proc**	**A D**	**A D**	**A D**	**Comments**
20	1	20L	100ml	F	1 1	2 2	1 1	Dry flot. 99% clinker. Few seeds of fig & distbd grnd plants

15 Conservation assessment

By Liz Barham

15.1 Quantification and assessment

15.1.1 Conservation

Table 16: Summary of conservation work

	Material	No. accessioned	No. conserved	No. to be treated (see below)
Inorganics	Ceramic	7	0	0
	Glass	2	0	0
Organics	Rubber	2	0	0

15.1.1.1 Introduction/methodology

The following assessment of conservation needs for the accessioned and bulk finds from the excavations at Bankside SE1, encompasses the requirements for finds analysis, illustration, analytical conservation and long term curation. Work outlined in this document is needed to produce a stable archive in accordance with MAP2 (English Heritage 1992) and the Museum of London's Standards for archive preparation (Museum of London 1999).

Treatments are carried out under the guiding principles of minimum intervention and reversibility. Whenever possible preventative rather than interventive conservation strategies are implemented. Procedures aim to obtain and retain the maximum archaeological potential of each object: conservators will therefore work closely with finds specialist and archaeologists.

All conserved objects are packed in archive quality materials and stored in suitable environmental conditions. Records of all conservation work are prepared on paper and on the Museum of London collections management system (mimsy XG) and stored at the Museum of London.

15.1.1.2 Finds analysis/investigation

The accessioned finds were assessed by visual examination, closer examination where necessary was carried out using a binocular microscope at high magnification. The accessioned finds were reviewed with reference to the finds assessment by Beth Richardson. The specialist finds report was unavailable at the time of the conservation assessment at the deadline but given the nature, small quantity and condition of the finds no further investigative work is anticipated.

15.1.1.3 Work required for illustration/photography

The specialist finds report was unavailable at the time of the conservation assessment at the deadline but given the nature, small quantity and condition of the finds, no further work to prepare finds for illustration is anticipated.

5.14.3 Preparation for deposition in the archive

The finds from this site are appropriately packed for the archive. No further work is necessary for transfer into the archive.

15.1.1.4 Remedial work outstanding

None

15.2 Method statements

15.2.1 Conservation

None required

15.3 Bibliography

English Heritage 1992 *Management of Archaeological Projects II*

Museum of London 1999 *General standards for the preparation of archaeological archives to be deposited with the Museum of London*

16 The Registered Finds

By Beth Richardson

16.1 The registered finds

Excluding the ceramic, glass and rubber bottle stoppers (see note by Nigel Jeffries) and a ceramic stove tile (note by Ian Betts) there are three registered finds; two small pieces of ceramic kiln furniture and a fragment of white pipe clay (possibly a testing piece) from context [15] (<3>, <*>) and a small piece of ceramic crucible (<4>, context [17]).

The fragment of kiln furniture (<3>) s made from highly-fired refractory yellow/light orange-firing clay which is glazed (probably self-glazed) on three surfaces. It may have come from a kiln-shelf, or just possibly from a saggar (purpose-made vessels made for firing specific types of pottery; eg Green 1999, 180-7). It is oxidised and would have come from a kiln making oxidised wares (e.g. red earthenwares or tin-glazed wares). The context is 20th century, but contains residual late 17th- and early 18th-century pottery and tobacco pipes; there were many pottery kilns in the Bankside area in the17th and 18th centuries and the kiln furniture or saggar will also be this date. A small piece of shaped white pipe-clay blackened or sooted on one side may be a test piece, fired to (e.g.) test kiln temperatures (<*>).

The crucible fragment (<4>) is highly-fired stoneware with a brown glazed internal surface. The external surface is missing. It could be from a large crucible of a type made for making glass (e.g. Willmott in Tyler and Willmott 2005, 45); again there were 17th- and 18th-century glasshouses in this area of London. The pottery from the context is mid 17th-century.

16.2 The bulk glass

A conical domed base from an early post-medieval natural green glass pharmaceutical phial was recovered from context [28]. The pottery from the context is 17th century.

16.3 Further work

If the site is published a short report on the industrial finds (pottery and glass manufacture) should be written by a post-Roman pottery specialist.

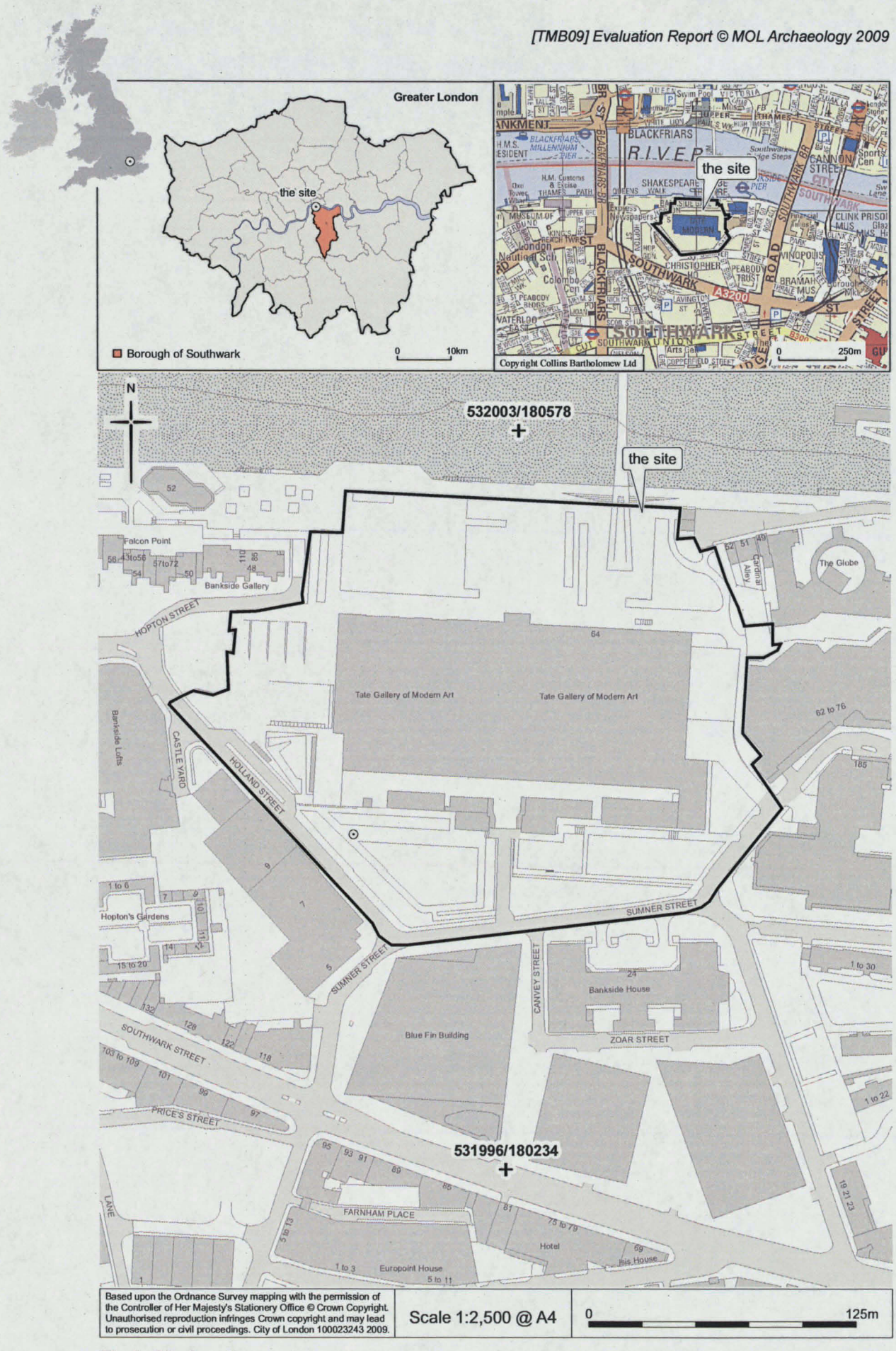

Fig 1 Site location

Fig 2 Location of evaluation trenches and boreholes

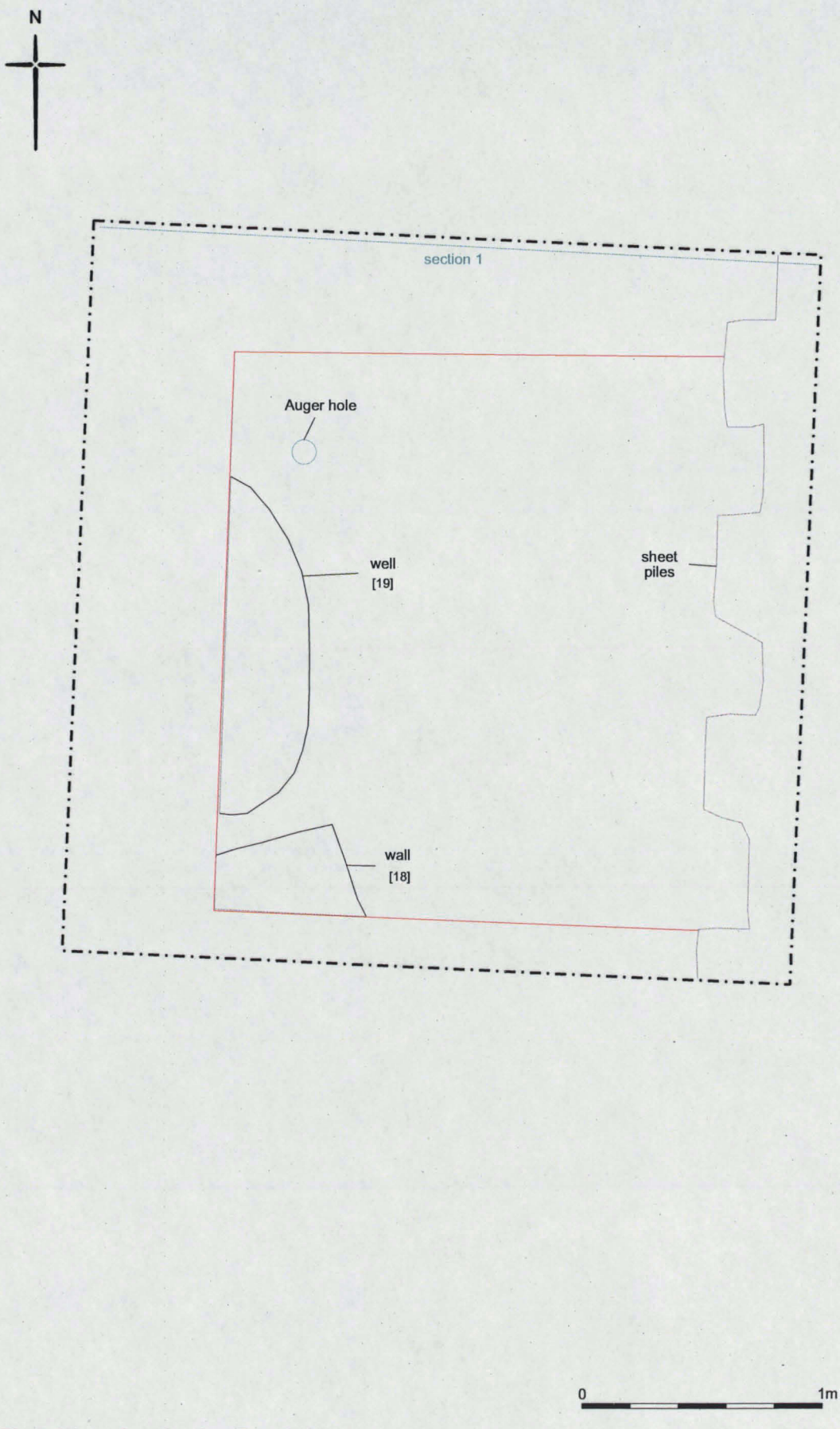

Fig 3 Plan of evaluation Trench A

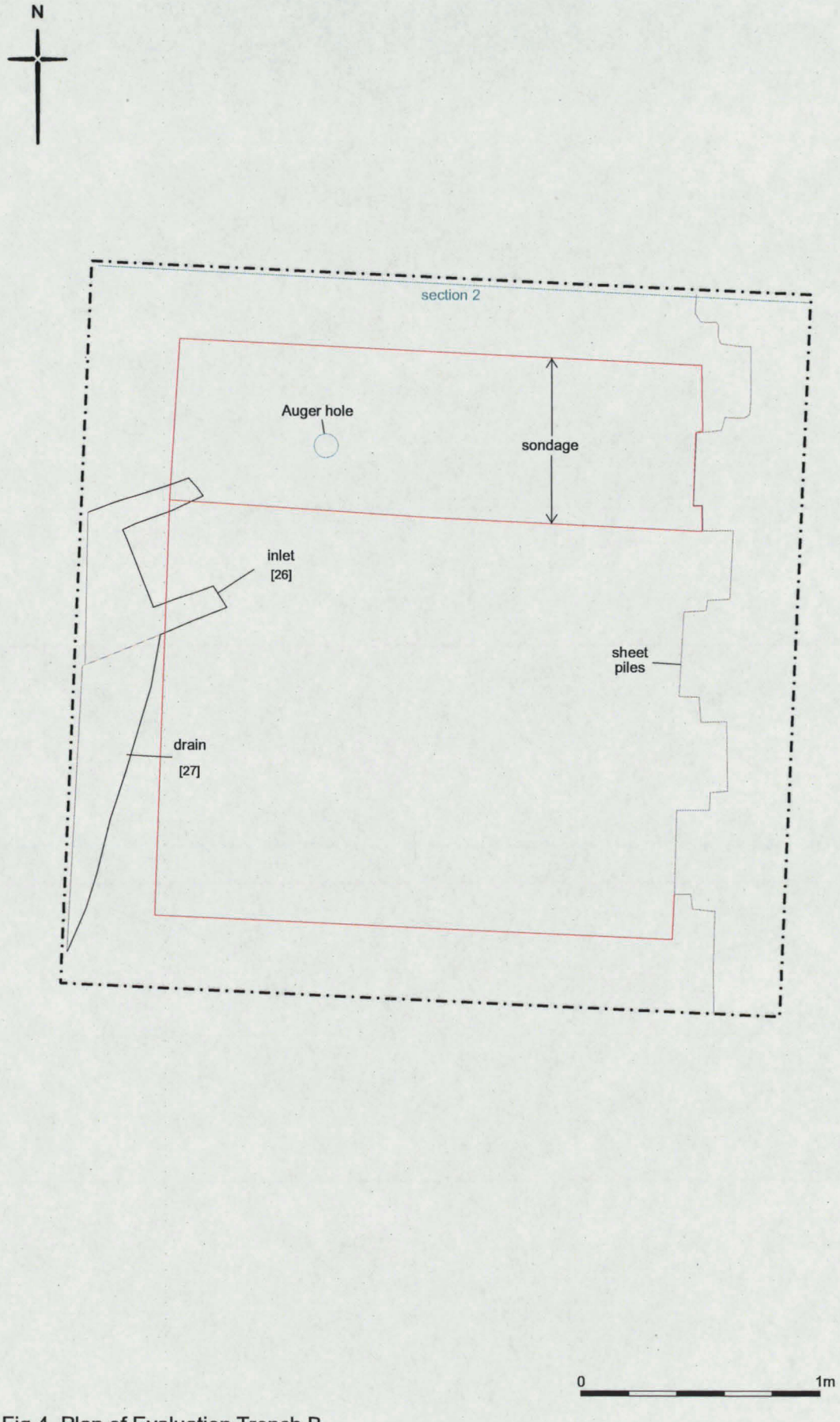

Fig 4 Plan of Evaluation Trench B

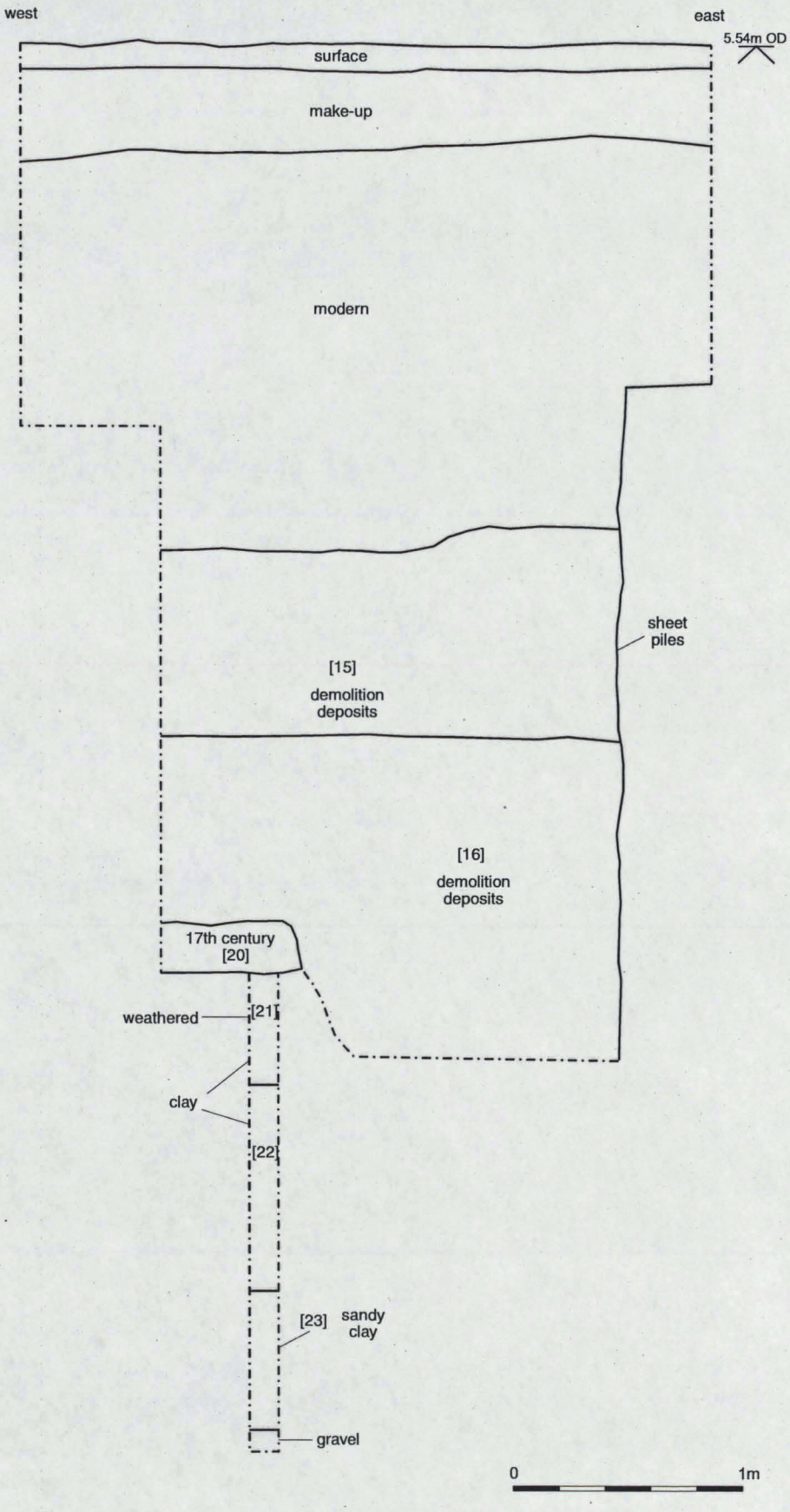

Fig 5 Section 1: Evaluation Trench A

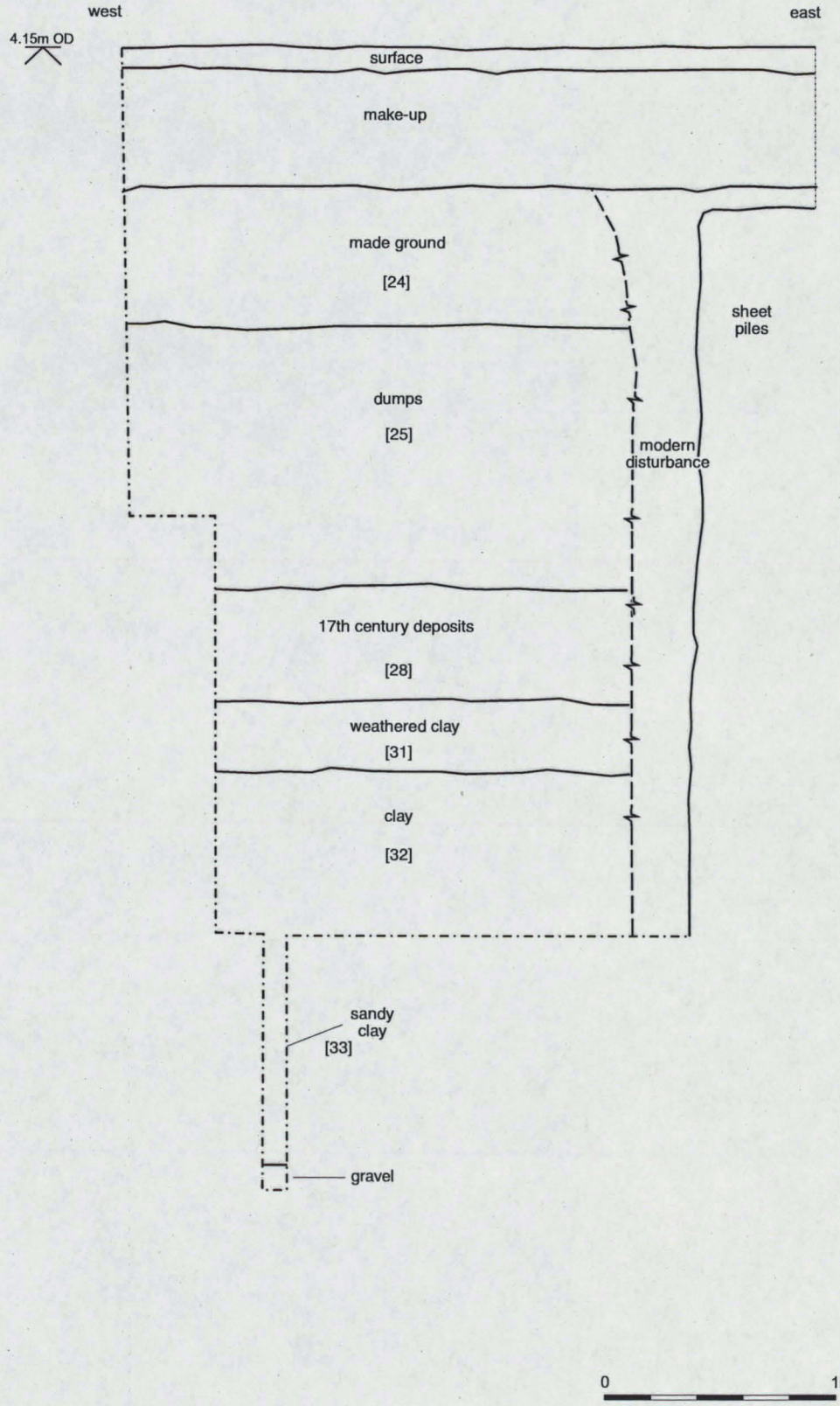

Fig 6 Section 2: Evaluation Trench B

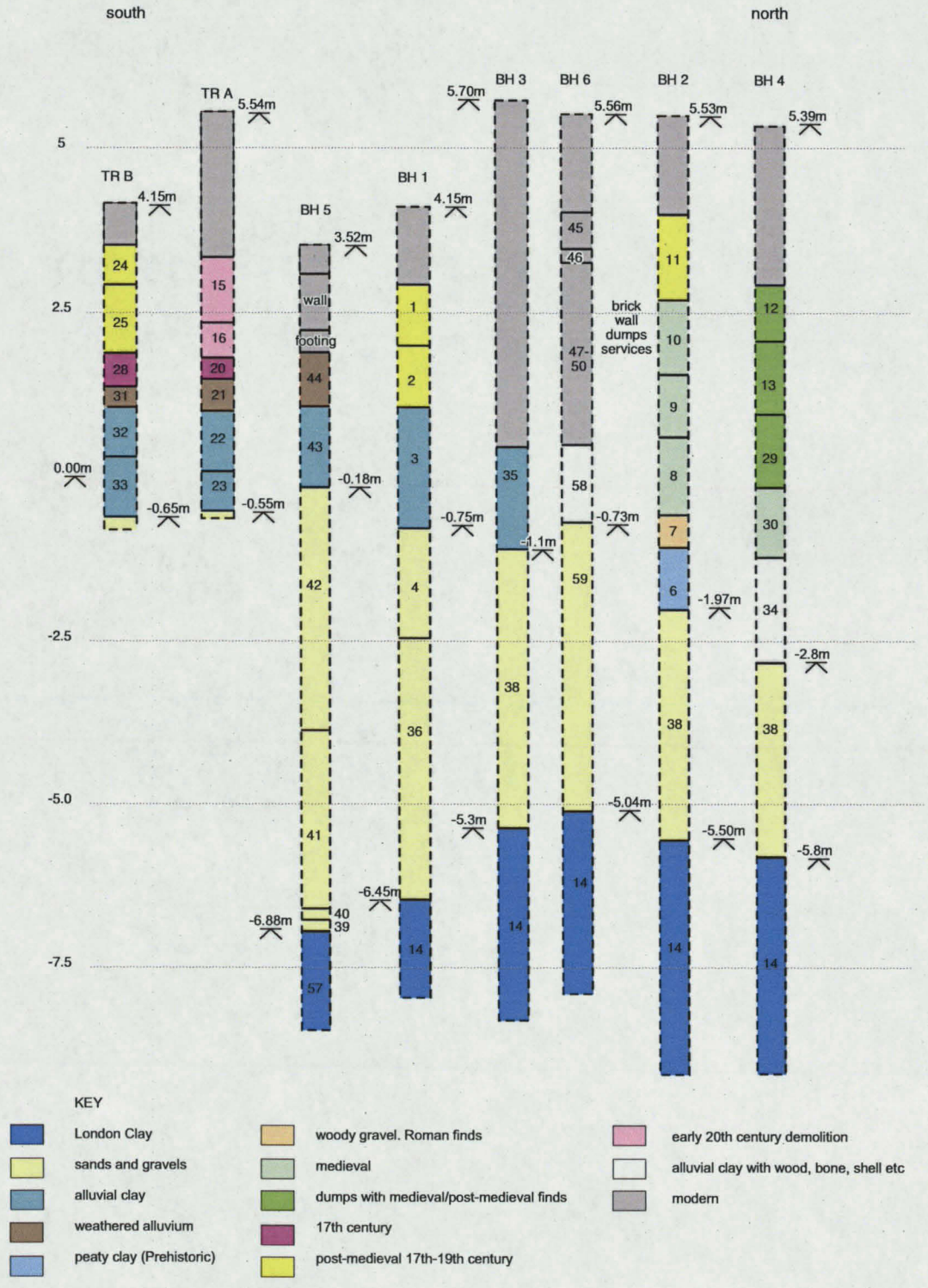

Fig 7 North-South profile through Boreholes 1-6