PLANNING DELIVERY ZONE 2
Work packages 3/5
Trench PDZ2.24/25

Work package 4
Boreholes NBHCZ2b-700, 701 and 702
E15

London Borough of Newham

A report on the evaluation

October 2008

MUSEUM OF LONDON Archaeology Service
PRE-CONSTRUCT ARCHAEOLOGY

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Site Code: OL-01707 and OL-06407
National Grid Reference: 537795 184345

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Summary (non-technical)

This report presents the results of an archaeological evaluation carried out by the Museum of London Archaeology Service and Pre-Construct Archaeology (MoLAS-PCA) on the site of Work Packages 3 and 5, Trench PDZ2.24/25 and three geoarchaeological boreholes (NBHCZ2b-700, 701 and 702), within the Olympic, Paralympic Games and Legacy Transformations Planning Applications: Planning Delivery Zone 2, London Borough of Newham, London E15. The report was commissioned from MoLAS-PCA by Capita Symonds Limited on behalf of the client the Olympic Delivery Authority (ODA).

Following the recommendations of the previous Detailed Desk-Based Assessment compiled for the Planning Delivery Zone, and subsequent consultation with the Greater London Archaeology Advisory Service (GLAAS), an evaluation trench was excavated (PDZ2.24/25) and three geoarchaeological boreholes (NBHCZ2b-700, 701 and 702) were drilled to replace to replace trench PDZ2.19, which could not be excavated owing to the thickness of made ground.

The results of the excavation of the trench (PDZ2.24/25) and boreholes (NBHCZ2b-700, 701 and 702) have helped to refine the initial assessment of the archaeological potential of PDZ2. The evaluation trench and boreholes have shown that a sequence of alluvial deposits of archaeological interest survives below about 3.4m OD and sealed by roughly 3m of 19th and 20th century made ground. The lower part of this alluvial sequence (below about 1.5m OD) was not examined within the trench in any detail because of rapid water ingress and contamination issues and samples were only obtained by augering through the base of the trench. The excavation was stopped because of rising water levels making the continuation of the excavation of the trench in a safe manner un-manageable. However, a tentative interpretation of this lowest part of the trench sequence and a more robust interpretation of its upper part and of full sequence within the boreholes, together with retained borehole cores and the collection of a sequence of bulk and monolith samples from the trench deposits above c 1.5m OD was made.

Preliminary interpretations suggest that a watercourse formerly crossed close to the boreholes at c. 1m to 1.5m OD. These deposits indicate a tidal creek or backwater stream that subsequently silted up with over bank flood deposits. Evidence of a later nearby watercourse was also located to the north in PDZ2.24/25.

In contrast, the height (c 2m OD) and characteristics of the sand and channel margin deposits, representing another watercourse located to the north in PDZ2.24/25, suggests it could be of historic age and maybe related to the watercourse identified nearby in PDZ2.21. The watercourses might be dated by radiocarbon analysis, as the silts and sands that accumulated on the riverbed or channel margins contain seeds and other plant remains suitable for radiocarbon dating. These plant remains, together with insects and snails also preserved within the samples taken from the active channel deposits have potential to reconstruct the characteristics of the river and the surrounding environment.

A sequence of organic and mollusc-rich silty clay deposits overlying the channel margin deposits indicates that the earlier watercourse was inundated with alluvium. In contrast the later watercourse silted up and became a creek or backwater as wetland deposits developed and spread across the location of the earlier proposed watercourse to the south. Microfossils (in particular diatoms and pollen) could be

preserved within these fine-grained sediments that might provide information about the changing characteristics of the river, as well as vegetation and landuse in the surrounding area.

When the stratigraphic information from this site has been tied in to the information recovered from the surrounding area (by inputting the data into the MoLAS-PCA geoarchaeological database for the Olympics Project), linked to historic map evidence and dated it is likely to have potential to contribute to our understanding of the evolving river regime of the Lower Lea.

Depending on the results of dating, it might also provide useful information about vegetation change and the changing environment of the Olympics Site during the historic period. Such information would be of real value, as environmental evidence is poorly preserved within the (typically weathered) alluvial clay that in general accumulated across the floodplain in historic time. It is only from the diminishing areas of continuing wetland, man made cut features and abandoned stream channels, such as that recorded in PDZ2.24/25 and NBHCZ2b 700, 701 and 702 that evidence for the historic environment is likely to survive.

In the light of revised understanding of the archaeological potential of the site the report concludes that further work on the samples already taken from the site would provide adequate mitigation of the archaeological resource.

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1 Introduction

1.1 Site background

The evaluations took place immediately west of the Waterworks River, in the eastern area of Planning Delivery Zone 2 (PDZ2) of the Olympic, Paralympic and Legacy Transformations Planning Applications, in the London Borough of Newham, designated as work packages 3, 4 and 5 PDZ2, hereafter called 'the site' (Fig 1).

This report summarises two areas of evaluation: an evaluation trench for PDZ2.24/25 and three geoarchaeological boreholes drilled to replace PDZ2.19. The combined works can henceforth be called the site.

Trench PDZ2.24/25 was excavated on the site of a former fish meal and meat factory. This intervention was located between the Waterworks River The River Lea and its towpath and the City Mill River, to the south of Marshgate Lane. A single evaluation trench combined work packages 3 and 5. The OS National grid reference for the centre of this area of the site is 537795 184345. Modern made ground level adjacent to Trench PDZ2.24/25 lies at 6.60m OD. The site code is OL-01707.

A series of three boreholes were drilled to replace trench PDZ2.19 owing to the depth of made ground. The boreholes were numbered NBHCZ2b-700, NBHCZ2b-701 and NBHCZ2b-702. Archaeological horizons were known to be *c* 7m below modern ground level, and the excavation of an evaluation trench in this area to such a depth was unfeasible. This change of strategy was approved by GLAAS. The OS National grid reference for the centre of this area of the site is 538025 184032. Modern made ground level adjacent to the boreholes lies at *c.* 9.20m OD. The site code is OL-06407.

The proposed development of the site involves the following works: use for a coach parking and drop-off area and ancillary spectator facilities; laying of services, service diversions and service protection works; construction of vehicle crossovers, ramp and junction realignments; installation of a telecommunication mast and construction of an ancillary compound; construction of a bridge numbered L01 including deck and substructure; and construction of changing rooms..

A desk-based assessment was undertaken for PDZ2 (MoLAS-PCA, 2007a), and should be referred to for information on the natural geology, archaeological and historical background of the site, and the initial interpretation of its archaeological potential.

A *Written Scheme of Investigation* (WSI) was prepared for PDZ2, describing and justifying the original evaluation locations and forming the project designs for the evaluations (MoLAS-PCA, 2007b).

1.2 Planning and legislative framework

The legislative and planning framework in which the archaeological exercise took place was summarised in the *Desk Based Assessments* and *Method Statements* which formed the project designs for the evaluations (MoLAS-PCA 2007a & b).

1.3 Planning background

In accordance with local and national policies, archaeological evaluation and survey the areas of PDZ2 to be impacted upon in advance of its redevelopment was required as part of the planning process. Evaluation is intended to define the archaeological potential and significance of any deposits present on the site, so that the local authority can formulate responses appropriate to any identified archaeological resource.

The evaluation of the subject site, PDZ2, was undertaken in support of a condition applied by the Olympic Delivery Agency Planning Decisions Team and attached to Planning Application Number 07/90011/FUMODA. The condition (SP.0.38) states:

> *The site Preparation Development shall not be commenced until a Written Scheme of Investigation for Archaeological Works has been submitted to and approved by the Local Planning Authority. This shall be in accordance with the Generic Written Statement for Archaeology, the Written Scheme of Investigation for Archaeological Field Evaluation and the relevant Detailed Desk-Based Assessment. The archaeological work shall be undertaken in accordance with the approved Written Scheme of Investigation. If significant archaeological finds are encountered, further archaeological works or design measures may be required to mitigate the impact of development on those remains. This condition may be discharged on a Planning Delivery Zone Basis.*
>
> *Reason: To ensure that archaeological remains are properly investigated and recorded.*

1.4 Origin and scope of the report

This report was commissioned by the Olympic Delivery Authority (ODA) and produced by the Museum of London Archaeology Service and Pre-Construct Archaeology Ltd (MoLAS-PCA). The report has been prepared within the terms of the relevant Standard specified by the Institute of Field Archaeologists (IFA, 2001).

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

The following research aims and objectives for PDZ2 were established in the *Method Statement* (MoLAS-PCA, 2007b) and WSI (MoLAS-PCA, 2006) for the evaluation, and in the Desk Based Assessment for PDZ2 (MoLAS-PCA, 2007a), and are intended to address the research priorities established in the Museum of London's *A Research Framework for London Archaeology* (2003):

- What is the potential for Late Glacial environment reconstruction and/or Late Upper Palaeolithic activity in the Pleistocene deposits on the site?
- What evidence exists for past river channels on the site and how does this contribute to our understanding of the origin of the modern and historic River Lea, Waterworks River and City Mill River, which form the boundaries of the site?
- Can episodes of channel activity and abandonment be dated?
- What potential is there for reconstructing the evolving river regime from environmental samples taken from the site?
- Is there evidence of past human activity associated with river exploitation or management? In particular, does evidence of wetland / stream exploitation exist that may be contemporary with the prehistoric activity previously found on the low terrace (at Warton Road)?
- What environmental evidence suitable for past landscape reconstruction exists within deposits associated with ancient channels of the River Lea and/or its tributaries? In particular, to what extent can environmental remains preserved within the alluvial deposits provide complimentary information to the archaeological evidence from Warton Road?
- Is there any evidence of a Roman road and/or occupation activity within the area of the site? If so, how does it relate to what is known of the settlement pattern further south in the Stratford Market area during the Roman period?
- What evidence for medieval/post medieval land use exists within the site area, including industrial and agricultural evidence?
- How extensive is modern truncation and how thick is modern made ground across the site?

2 Topographical and historical background

The following summary of the geological and archaeological background to the site is based upon the desk based assessment for PDZ2 (MoLAS-PCA 2007a).

2.1 Modern topography and drainage

Planning Delivery Zone 2 is located roughly in the middle of the valley floor of the River Lea, *c* 3.5km to the north of its confluence with the River Thames. The site is bounded on three sides by river channels. The River Lea, which is tidal for some distance upstream of the site, forms its northern boundary, with its western and eastern sides following the canalised City Mill and Waterworks Rivers respectively.

Modern ground level across the site lies at around 6m OD. The edge of the valley floor lies *c* 500m to the west and *c* 900m to the east of the site, where the ground rises up the valley sides onto the river terrace.

The modern topography and drainage of the area has been much modified by man and bears little resemblance to the landscape of the site in historic and prehistoric times. Modern ground raising has masked the natural land surface by several metres of 'made ground'. Similarly, very little remains in the modern landscape of the natural course of the Lea, which today flows through a series of mostly man–made canalised and culverted channels, such as those bounding the site itself.

2.2 Natural topography and past landscape setting

The site lies within the deepest part of the valley floor, which is likely to have been exploited by channels of the River Lea and perhaps its tributaries in the prehistoric and historic past.

There is potential for environmental remains of Pleistocene date to be preserved in fine–grained and organic units within the gravels that underlie the alluvium. Previous radiocarbon dating suggests that such remains could provide a better understanding of the river regime and environment of the Lower Lea in the Late Glacial (Upper Palaeolithic) period. In addition, evidence of Late Upper Palaeolithic and Early Mesolithic activity, which may include knapping scatters such as those found in similar locations further upstream and within the Colne valley, may be found at the base of the alluvial sequence, associated with channel bars that existed within the braided river channel. Peat deposits are also likely to have accumulated in abandoned channels in the early post–glacial period, which have excellent potential for preserving plant remains, pollen and insects that can reconstruct the environment at the Pleistocene / Holocene transition.

Prehistoric and historic deposits relating to former river channels, which may have been streams of the Lea or its tributaries, are likely to exist on the site. Very little is yet known about the past river pattern within the Lea Valley or of the origin of the river channels that exist today and are recorded on historic maps. There is good potential for evidence of the past river regime to be found on the site. In addition to mapping former river channels, information about rising river levels during the

Holocene, the progressive upstream influence of tidal water, and human river management might also be found. However, dating the river deposits, especially if inorganic (i.e.: not suitable for radiocarbon) and lacking in finds may be difficult especially as, owing to natural processes of river erosion and deposition, the alluvial stratigraphy may be complex and deposits difficult to correlate. This may be compounded by lack of suitable exposures for recording, as the archaeological deposits are likely to be buried by about 6m of recent made ground across most of the site, especially south of Marshgate Lane.

Indirect evidence that could contribute to building up a picture of the prehistoric activity taking place on the low terrace, as recently found in the Warton Road area is also likely to be preserved within the alluvium on the site. This is the sort of information recommended in the recent English Heritage guidelines for environmental archaeology and geoarchaeology (EH 2002; 2004 respectively). The guidelines recognise the significance of 'off–site' environmental evidence – i.e.: from places where no tangible archaeological remains exist but where natural deposits are likely to have accumulated (such as backwaters and abandoned channels). Such locations are an archaeological resource in their own right, as they preserve information about the past environment and also indirect evidence of human activity that may no longer exist on occupation sites themselves. The preservation of environmental remains (pollen, diatoms, insects and seeds) is likely to be far better in the alluvium of PDZ2 than in the dry prehistoric land surface at Warton Road. In addition, a more continuous and better–stratified sequence of deposits spanning the period of prehistoric occupation is likely to be preserved on PDZ2 than survives in the archaeological features at Warton Road. Thus valuable complimentary evidence, which can be used to better understand the archaeology excavated at Warton Road is likely to be found in PDZ2.

There is also good potential for evidence of river exploitation to be found in the PDZ2 deposits. Riverside structures of prehistoric and historic date, such as bridge piers, timber jetties, platforms and revetments might be associated with stream channels; and in areas of slackwater, trackways, fish traps and even abandoned boats might exist. Good preservation by waterlogging means that, in addition to timber structures, archaeological evidence is likely to include organic, wooden and leather artefacts, which are rarely found on dryland sites. It should be borne in mind, however, that such remains are also likely to require more elaborate techniques of excavation and conservation than those used for standard dryland archaeology.

2.3 Prehistoric

There is good potential for evidence of environmental change of prehistoric and later date to be preserved within the alluvium on the site.

Such evidence, together with any *in situ* remains of prehistoric and later date preserved within peat or alluvial deposits are considered to be of moderate to high importance for their potential to contribute significantly to the local published priorities including the following research objective: 'Understanding London's hydrology and river systems and tributaries…in shaping London's history, and the relationships between rivers and floodplains' (Museum of London 2002, 79).

However, any remains providing evidence for prehistoric water management will be of high importance due to their regional rarity.

Any palaeo–environmental evidence for topographic and climate change preserved in the alluvial deposits is also considered to be of moderate importance as it has the potential to contribute significantly to the characterisation of changing climatic conditions and towards understanding its implications for how people behaved (Museum of London 2002) and understanding London's hydrology and river systems and tributaries in shaping London's history, and the relationships between rivers and floodplains (Museum of London 2002). Such palaeo–environmental remains share group value with any similar evidence in the other parts of the Lea Valley in terms of collective interpretation and status.

There is also moderate potential for stray finds and structures of the Neolithic to Iron Age periods, associated with stream channels and wetland areas, given the known dryland activity recently found on the low terrace above the south eastern part of the site.

2.4 Roman

Given the already known details of the Roman London to Colchester road, there is moderate potential of finding evidence for the Roman London to Colchester road within the site. Any remains or finds associated with the Roman road considered to be of high importance due to regional rarity value and for the potential to contribute to published priorities including the local research objective "Understanding the reasons for evolution of the road systems, street layouts, river crossings and ferries, and their importance as engines of development and change" (Museum of London 2002, 82). If the Roman road does indeed cross the site, there is also an attendant moderate possibility that structures and features associated with the road may lie within the site area.

2.5 Saxon

Historic maps suggest that the old River Lea, flowing south through Stratford, branched into several channels, collectively called the Stratford Back rivers. Although the pattern of channel has been associated with King Alfred, who in 895 AD apparently obstructed the river to strand the Danish fleet, the evidence is inconclusive. The pattern does however; seem to go back to at least the 11th century.

The evidence for Saxon activity, apart from the rivers, in the vicinity of the site is limited to occasional finds of pottery and waste. There is a low potential for remains of this period to be present on site. Since the site is flanked on three sides by waterways, there is a moderate possibility that structures associated with the management of these rivers may well survive, preserved in the alluvial deposits of the rivers. However, given the ongoing nature of such waterway management, there is a much higher likelihood that any surviving examples would date from the medieval/post–medieval periods. If Saxon channels crossed the central parts of the site, which is certainly possible, given the evidence for channel migration at Carpenter's Road and for the location of the Saxon palaeochannel at the Stratford

Box then the chances of recovering Saxon riverside structures and evidence for waterway management will increase.

Any Saxon land use evidence (e.g. mills and associated activity) is considered to be of high importance because of regional rarity value and has potential to contribute significantly to the local published priorities including the following research objectives: 'Understanding the relationship between different urban foci within the London region' and 'Studying the correlation between sites associated with watercourses…so as to understand the origin of settlements' (Museum of London 2002, 80).

2.6 Medieval

As mentioned above, the site is surrounded on three sides by water, and these river channels have been created and maintained from the very beginning of the Medieval period. Consequently there is a moderate to high possibility of waterfront structures surviving, preserved in the alluvial deposits of the sides of the River Lea and the Waterfront river.

Any medieval land use evidence is considered to be of moderate importance because it characterises the area's townscape and has potential to contribute significantly to the local published priorities including the following research objectives: 'Establishing through the archaeological record how sustainable and determined (or not) were public and civic efforts to put in place, and then maintain, different aspects of London's infrastructure' and 'Contributing to the understanding of London's place as an industrial power' (Museum of London 2002, 69, 74). Any such post–medieval remains share group value with any such evidence in the other parts of the Olympic development in terms of collective interpretation and status.

Any significant *in situ* remains that were present could be of moderate importance and share group value with any similar evidence in the other parts of the Olympic development area in terms of collective interpretation and status.

2.7 Post-medieval

There is moderate potential for industrial remains associated with the possible mill site, and any attendant structures that may have existed along the riverbanks. The aforementioned river frontage also affords a moderate to high possibility for the preservation of organic remains associated with the industrial activities and the maintenance of the waterfronts.

Any post–medieval land use evidence (industrial use) is considered to be of moderate importance because it characterises the area's townscape and has potential to contribute significantly to contributing to the understanding of London's place as an industrial power (Museum of London 2002). Any such post–medieval evidence shares group value with any such evidence in the other parts of the Lea Valley in terms of collective interpretation and status.

3 The evaluation

3.1 Methodology

All archaeological excavation and monitoring during the evaluation was carried out by a joint MoLAS-PCA team in accordance with the preceding *Method Statement* (MoLAS-PCA, 2007b), and the MoLAS *Archaeological Site Manual* (MoLAS, 1994).

3.1.1 Evaluation Trench PDZ2.24/25 (OL-01707)

The proposed trenches PDZ2.24 and PDZ 2.25 for work packages 3 and 5 respectively were combined into a single trench numbered PDZ2.24/25. This was aligned north-east to south-west and parallel with the north-west bank of the adjacent Waterworks River. The trench centre was located approximately 15m from the bank of the Waterworks River. Excavation of the trench commenced 12 march 2008 and was completed 19 March. See Fig 2.

The ground was broken out and cleared by the contractor's mechanical excavator using a flat bladed ditching bucket under MoLAS-PCA supervision. The trench was excavated by machine by the contractors, and monitored by a member of staff from MoLAS-PCA. The trench was machine excavated to a depth of 4.80m below the level of the existing river towpath and stepped, in four stages, at a ratio of 1:1.5. The overall size for the top of the trench was 21m x 12.5m. The trench base measured approximately 12m x 4.00m.

MoLAS-PCA geoarchaeologists visited the trench during excavation to examine and interpret the deposits in plan and section and to take samples as appropriate and to auger deposits of interest that lay below the base of the trench.

The deposits were allocated unique context numbers and these are discussed as single entities in the current report. The presence of perched water within the deposits made excavation; probing of the lower alluvial sequence during excavation indicated that artesian pressure from the ground water precluded total excavation of the sequence down to the underlying gravels. The earliest deposits of sand and gravel were only identified by probing the base of the trench and as a consequence of this only a single context has been allocated for these deposits and the discussion remains constrained by the limited observations. A power auger was used to access sediments below the base of the trench. Samples retrieved in the power auger were extruded and wrapped for examination and sub-sampling off site.

MoLAS-PCA surveyors located the trenches. This information was electronically collated and plotted onto the OS grid. Levels were calculated from benchmarks established by Nuttall's engineers

A written and drawn record of all archaeological deposits encountered was made in accordance with the principles set out in the MoLAS site recording manual (MoLAS, 1994).

The trench has produced: one trench location plan; a trench plan at 1:100; 14 context records; 2 section drawings at 1:20; one section drawing at 1:50 and a number of environmental samples (4 bulk, plus a sequence of 3 monoliths and 3 radiocarbon samples). The site finds and records can be found under the site code OL–01707 in the MoL archive.

3.1.2 Geoarchaeological boreholes NBHCZ2b 700, 701 and 702 (OL-06407)

All geoarchaeological on-site drilling and off-site core preparation work, during the borehole survey was carried out where appropriate in accordance with the MoLAS *Archaeological Site Manual* (MoLAS, 1994) guided by the recommendations outlined in the English Heritage Guidelines for Environmental Archaeology and Geoarchaeology (EH 2002; 2004 respectively).

Three boreholes (NBHCZ2b 700, 701 and 702) were drilled across the proposed location of trench PDZ2.19 with a cable percussion rig, by Ritchies (Division of Edmund Nuttall Ltd) for geoarchaeological purposes, as part of the geotechnical investigation, in June 2008 (Fig 3). The borehole locations were recorded by Ritchies to the OS grid, with the heights at the top of the boreholes recorded in m OD (metres above Ordnance datum). The boreholes commenced 25 June 2008 and were completed 30 June. See Fig 2.

The drilling work was monitored by a MoLAS-PCA geoarchaeologist and continuous core samples were obtained from the boreholes (U100) for off-site examination.

All the core samples were extruded, cleaned and described off site, using standard geoarchaeological criteria: characterising the visible properties of each deposit, in particular relating to its colour, compaction, texture, structure, bedding, inclusions, clast-size and dip. For each profile, every distinct unit was given a separate context number, starting at [3, as the previous evaluation work (MoLAS 2007) identified contexts [1] to [2] and the depth and nature of the contacts between adjacent distinct units was noted. The paper log sheet records form part of the site archive. The core sample logs were entered into a digital (Rockworks 2006) database.

Individual lithostratigraphic units (contexts) with related characteristics within a borehole were grouped together and then linked with similar deposits, which may be made up of a number of individual contexts (lithostratigraphic units) in adjacent boreholes. Linking deposits between boreholes produced a series of site-wide deposits (facies), which are representative of certain environments. Thus a sequence of environments both laterally and through time has been reconstructed for the site. These facies groups are used as an aid to interpreting and presenting the data and discussing the results (see Fig 5)

3.2 Results of the evaluation

For trench location see Fig 2. See also Fig 3 and Fig 4.

3.2.1 Evaluation Trench PDZ2.24/25 (OL-01707)

Location	approximately 15m to the south-west of

	the bank of the Waterworks River, in the north-east of PDZ2
Dimensions	12.0m NW-SE x 4.0m NE-SW at trench base; 4.8m deep
Modern ground level	6.60m OD
Base of modern fill	3.44m OD
Depth of archaeological deposits seen	1.6m
Level of base of trench	1.78m OD
Alluvium observed	2.6m OD
Gravel observed	1.5m OD (auger)

Table 1 Trench PDZ2.24/25 deposit summary

3.2.1.1 River gravel deposits

The earliest context [113] was identified by probing the base of the trench and consisted of river gravel deposits overlain by a sand layer of variable thickness. Further elaboration on the natural deposits was limited by the nature of investigation. The top of the gravel lay at *c* 0.50m below the trench base, (*c*. 1.50m OD).

3.2.1.2 Alluvial deposition

The sand and gravel was overlain by friable, dark greyish-brown, sandy-silt that contained frequent small molluscs and occasional organic fibres [112]. The deposit indicates natural, probably fluvial or possibly alluvial origins; the sandy component suggests that it was formed in a higher energy environment than the overlying sequence. The presence of abundant molluscs could identify this as a possible channel margin, backwater area or the silting up of a channel.

Soft, mid grey-brown, clay silt with fine sand [109] overlay the deposits identified by auger at the trench base. This was only partly excavated to a depth of around 0.10m within the base of the trench. The layer contained occasional small fragments of mollusc shell and occasional to rare wood chips. The surface of this layer appeared to deepen towards the north-west end of the trench and was not visible in the final metre of the trench section. The surface level lay at 1.90m to 1.80m OD and its thickness, confirmed by auger, was 0.15m. The layer was succeeded by soft mid brown-grey to blue-grey clayey-silt [108] that also contained occasional mollusc fragments, as well as rare pea-sized gravel. This deposit was seen throughout the whole length of the trench although its surface also appeared to slope down to the north-west. The surface level lay at 2.06m to 1.96m OD whilst its maximum thickness was 0.22m. The deposits [109] and [108] probably derived from a fluctuating low energy fluvial deposition, as also indicated in [112], and may indicate a channel margin area or the silting up of a possible tidal creek or seasonal secondary channel.

Soft, mid brownish-grey, clayey-silt [107] that contained frequent dark bluish-black patches and occasional small yellowish-white calcareous nodules sealed alluvial layer [108]. The deposit surface lay at 2.36m to 2.24m OD and was 0.32m thick. The deposit is likely to have been formed as a consequence of low energy alluvial processes or as the broad channel silted up. The inclusions are almost certainly the result of post depositional processes, with the calcareous nodules perhaps associated

with the downward movement of water through the deposit that could suggest variations in the water level over time.

Deposit [110] was a soft light blue-grey clayey-silt that also contained the same dark bluish-black patches and the same small yellow-white calcareous nodules, although here they were more frequent. This deposit was likewise seen throughout the whole length of the trench, it had a maximum thickness of 0.32m and the surface level was between 2.64 to 2.50m OD. The formation process for this deposit is natural, probably a low energy alluvial of possibly fluvial deposition process. As with context [107] the inclusions are almost certainly the result of post depositional processes, with the calcareous nodules perhaps associated with the downward movement of water through the deposit, which could suggest variations in the water level over time.

3.2.1.3 Buried soil

Layer [107] was sealed in turn by soft, dark grey-brown, fibrous clayey-silt [106] 0.26m thick from a surface level of 2.80m to 2.62m OD. The interface between this deposit and the underlying and overlying contexts was diffuse. The diffuse interface and dark hue may indicate post depositional bioturbation of an alluvial deposit. This combination suggests a waterlogged horizon of medieval to post medieval buried soil.

3.2.1.4 19th to 20th century deposition

This was overlain by a loose, mixed dark grey and black, coarse gritty sand and clay [105] containing moderate amounts of twigs, ceramics and pebbles. The associated ceramics date to the late 19th or first half of the 20th century (see 11: Appendix 3: Finds assessment). The deposit measured up to 0.22m thick and the surface level lay at 2.96m to 2.78m OD. The interface [105] and [106] and the underlying deposit was diffuse. This deposit probably indicates a disturbed pre-dump surface and may represent the final phase of underlying deposit [106].

Deposit [111] was present in the south-east corner of the trench and consisted of a friable light grey material, possibly sandy silt. The layer had a thickness of 0.20m from a surface of 2.96m to 2.86m OD. The deposit derives from discarded industrial waste/residue of uncertain origin, for this reason it was not examined in any detail. This was overlain across the trench extent by a friable mixed dark brown and mid greenish-grey coarse sandy clay [104]. The layer survived to 3.26m OD and measured up to 0.38m thick. The formation process for this deposit is not certain, however some evidence of sediment sorting was observed suggesting it may represent a high-energy fluvial deposit associated with the adjacent river. This layer sealed deposits containing modern ceramics, indicating its formation is of recent date.

The remaining contexts within the trench represent material of recent origin and as a consequence were only recorded in a small representative section. A 0.20m thick layer of friable, mixed dark grey and dark greenish-grey fibrous sandy clay [103] containing small wood fragments, present at 3.46m OD. Although uncertain, the deposit may represent a disturbed river edge deposit or the initial phase of deliberate infilling/levelling. The overlying deposit comprised a mixed loose black gritty clayey sand [102], containing CBM and other modern debris. Its thickness was 0.74m and the surface was 4.22m OD. This layer represents a deliberate levelling/infilling episode probably associated with the adjacent riverside wall. Context [101] was a

friable dark brown gritty clayey sand containing glass, ceramics, metal, CBM plus other modern material, measuring 2.20m in depth to a height of 6.40m OD. This deposit represents a deliberate levelling/infilling episode probably associated with the adjacent riverside wall. A loose mid white-grey layer of stone fragments [100] with a thickness of around 0.20m and a surface level of 6.60m OD capped the sequence. This layer comprises the existing river side footpath running along the edge of the Waterworks River.

3.2.2 Geoarchaeological boreholes NBHCZ2b 700, 701 and 702 (OL-06407)

3.2.2.1 Lithology and stratigraphy

See Table 5. For location see Fig 2. See also Fig 5.

The results of the three boreholes NBHCZ2b 700, 701 and 703 have been examined by MoLAS-PCA geoarchaeologists.

The locations of these boreholes are shown in Fig 3.

These boreholes have provided a general understanding of the characteristics of the deposits present in the vicinity of the proposed trench PDZ2.19.

SITE-WIDE FACIES	Context	Depth (top) below ground level (bgl)	Deposit thickness	Description	Interpretation
Facies 7	**GROUND LEVEL AT c 9.23m OD**				
	0m –6.0m bgl no cores (concrete, rubble etc)				
	3	0	6	Made ground	Made ground
	4	6	0.3	Mod well consolidated pale greenish white gritty material.	
	5	6.3	0.1	Loose, dark brown/black v organic deposit. Freq wood and woody fibres. Sharp contact.	
	6	6.4	0.4	Variably firm-soft, brown/black occasionally gritty, peaty clay silt. Freq glass and other detritus.	
Facies 6	**Sharp interface at c 2.43m OD**				
	7	6.8	0.3	Firm, greenish yellow silt clay with manganese mottling, freq Fe staining. Gradual contact.	Alluvium; overbank flooding, yellow color indicative of Fe (limonite) weathering or hydration/oxidation. .
Facies 5	**Gradual interface at c 2.13m OD**				
	8	7.1	0.1	Mid-dark grey brown, slightly humic silt clay. Manganese precipitate down fine root channels. Contact disturbed by drilling, not visible.	Wetland/mudflat deposits.
Facies 4	**Interface at c 2.03m OD**				
	9	7.2	0.5	Soft-firm, greenish blue grey silt clay becoming brownish in patches. Mod manganese flecking throughout, v occ small gritty white calcareous inclusions around 7.6mBGL.	Alluvium, overbank flood deposits.
Facies 3	**Diffuse interface at c 1.53m OD**				
	10	7.7	0.65	Firm, blueish grey slightly fine sandy silty clay. Mod fine roots, v occ fine-med gravel. Diffuse contact into below. Mod manganese throughout.	Near river / channel margin deposits, low energy or slow flowing water.
	11	8.35	0.15	Firm, greenish grey fine-med sandy silt clay becoming more sandy downwards.	
Facies 2	**Diffuse interface at c 0.73m OD**				
	12	8.5	3	Loose, sub round-sub ang, fine-med gravel, some larger clasts. Gravels are grey with occ clay pockets and sand.	Pleistocene gravels
Facies 1	**Sharp interface at c -2.27m OD**				
	13	11.5	-	Shelly clay beds	Upper shelly beds, Lambeth Group

Table 2 Lithology and stratigraphy, Borehole NBHCZ2b 700

SITE-WIDE FACIES	Context	Depth (top) below ground level (bgl)	Deposit thickness	Description	Interpretation
Facies 7	**GROUND LEVEL AT c 9.13m OD**				
	0m –6.45m bgl no cores (concrete, rubble etc)				
	14	0.0	6.45	Made ground	Made ground
	15	6.45	0.70	Friable, v dark grey/near black (manganese stained) slightly organic clay silt. Occ granule sized brick and stone. Also with brownish orange (Fe oxide) 'marbling' in places. Becomes gradually more greyish brown downwards.	
Facies 6	**Sharp interface at c 1.98m OD**				
	16	7.15	0.30	Stiff, slightly greenish, light brownish grey clay silt with mod-freq manganese flecking and occ calcareous gritty inclusions. Basal contact not visible.	Alluvium, overbank flood deposits.
		7.45	0.15	No retrieval	
Facies 5	**Interface at c 1.53m OD**				
	17	7.6	0.20	Stiff, dark, slightly greyish brown humic clay silt with mod-freq manganese flecking. Occ fine rooty fibres. Horizontal contact with underlying.	Wetland/mudflat deposits.
Facies 4	**Sharp interface at c 1.33m OD**				
	18	7.8	0.25	Firm-stiff, mid- dark blueish grey silt clay/clay silt. Occ small sandy pockets and gritty, white, calcareous inclusions. Becomes gradually more sandy into underlying unit.	Alluvium, overbank flood deposits.
Facies 3	**Gradual interface at c 1.08m OD**				
	19	8.05	0.45	Firm-stiff, mid-dark blue grey fine sandy silt clay/clay silt. Occ ang flint (fine-med gravel sized). Sand becomes slightly coarser basally. Occ fine-med "twiggy" organic 9wood) inclusions, esp near base. Horizontal contact with underlying.	Near river / channel margin deposits, low energy or slow flowing water..
	20	8.5	0.05	Firm, mid-dark greyish brown (more orange in patches) slightly clayey sand (med, occ coarse). Occ fine fibrous organics, occ sub ang-sub round, fine-med gravel.	
Facies 2	**Gradual interface at c 0.58m OD**				
	21	8.55	2.95	Loose, sub ang-sub round, sandy, fine-med gravel. Poorly sorted.	Pleistocene gravels

Facies 1	**Sharp interface at c -2.37m OD**				
	22	11.5	-	Shelly clay beds	Upper shelly beds, Lambeth Group

Table 3 Lithology and stratigraphy, NBHCZ2b 701

SITE-WIDE FACIES	Context	Depth (top) below ground level (bgl)	Deposit thickness	Description	Interpretation
Facies 7	**GROUND LEVEL AT c 9.17m OD**				
	0m –7.0m bgl no cores (concrete, rubble etc)				
	23	0	7.00	Made ground. Gritty, contaminated, strong hydrocarbon odour.	Made ground
	24	7	0.05	Hard, dark grey brown/near black slightly sandy clay silt. Reworked alluvium.	
Facies 6	**Sharp interface at c 2.12m OD**				
	25	7.05	0.55	Soft, blue grey silty clay with occ-mod manganese mottling. Very gradual contact with below.	Alluvium; overbank flooding, yellow color indicative of Fe (limonite) weathering or hydration/oxidation.
Facies 2a	26	7.6	0.40	As above but no manganese. Mottled with dark orangey brown (Fe oxide?). Becoming slightly gritty at base. Basal contact not visible.	Buried land surface; at base probably a dry soil developed in fine grained Pleistocene deposits.
Facies 2	**Interface at c 1.17m OD**				
	27	8	3.10	Loose, sub ang-sub round, sandy, fine-med gravel. Poorly sorted.	Pleistocene gravels
Facies 1	**Sharp interface at c -1.93m OD**				
	28	11.1	-	Shelly clay beds	Upper shelly beds, Lambeth Group

Table 4 Lithology and stratigraphy, NBHCZ2b 702

3.2.2.2 Lambeth Group gravels

The Upper shelly beds of the Lambeth Group (Facies 1) were encountered at a fairly constant level between *c* -2.0 and -2.3m OD and represent deepwater marine and estuarine sediments deposited during the Lower Eocene Epoch. The gravels and sands that overlie the Lambeth Group (surface roughly between 0.58m and 1.17m OD are thought to be of a Pleistocene date and to have been deposited by glacial outwash. These gravels (Facies 2) extend across the site and were recorded at similar levels in the boreholes, dropping slightly in elevation towards the north.

3.2.2.3 Alluvial deposition

Overlying the gravels but only present variably across the site are sandy silty clays (Facies 3). The surface of this facies lies between 1.08 and 1.53m OD and the deposits were only recorded in two boreholes (NBHCZ2b 700 and 701). The deposit thickens out towards the north as the elevation of the underlying gravel lowers. The sand content indicates a low energy fluvial input of a near by river or possibly part of a tidal creek of back water stream. This facies grades up into a blue grey silty clay (Facies 4) that lies between 1.33 and 2.12m OD and probably represents overbank alluvial flood deposits.

A thin humic clay seals the lower alluvium (Facies 5). It lies between 1.53 and 2.13m OD and is again present in only the two northern boreholes. These deposits suggest a waterlogged wetland or probably mudflat environment near to an active channel. This grades up into a mottled orange blue grey silty clay (Facies 6), which is between 0.30m and 0.45m thick and lies at around 1.98 to 2.43m OD. It is thicker towards the north and may exist in the southern borehole albeit in a disturbed or redeposited state.

The blue grey colouring of the lower alluvium indicates poor drainage and anaerobic conditions (gleying) as river level rises and is in contrast to the orange mottling, iron staining, evident in this upper alluvial clay. The iron staining suggests exposure to the surface and drier conditions as river level, perhaps linked to RSL, lowers or that it accumulated further from the active river than the gleyed deposit, as a result of natural channel migration or channel manipulation.

3.2.2.4 Made ground

Sealing these deposits were a number of layers of made ground (Facies 7) extending from 9.23m OD to 9.13m OD, the main units of these layers were not recorded in detail or sampled.

3.3 Stratigraphic interpretation of the site

The deposits recorded in the trench and the geoarchaeological boreholes can be allocated to eight distinct phases of deposition. The date and environments represented by theses phases can only be tentatively suggested, however, until radiocarbon dating and further work on the samples collected from the deposits has been undertaken.

3.3.1 Phase 1: Eocene and Pleistocene deposits (Buried topography)

The Upper shelly beds of the Lambeth Group were encountered in the boreholes at *c* 2.0m OD and represent deepwater marine and estuarine sediments deposited during the Lower Eocene Epoch. This surface forms the bottom line for deposits of archaeological interest. The gravels recorded in the test pit at the south west end of the trench and in the boreholes were encountered at *c* 1.5m OD (PDZ2.24) but do begin to lower in elevation, to 0.58m OD (NBHCZ2b-701), towards the south before it begins to rise again to 1.17m OD (NBHCZ2b-702). The gravels are probably of a Pleistocene date and a result of glacial outwash. However, inadequate observation was made of the gravels encountered in the trench to be confident about their date or environment of deposition. A prehistoric land surface may be present in facies 2a (NBHCZ2b-702) as there is evidence of weathering and soil development in possible fine grained Pleistocene deposits that overly the higher gravels.

3.3.2 Phase 2: Foreshore or active river environment

A sandy silty clay (facies 3) with a variable and occasional gravel content was recorded between 1.08m to 1.53m OD and is associated with low lying areas of gravel in the south of the site (NBHCZ2b-700 and 701). The deposits may represent slow moving fluvial processes, associated with backwater or channels marginal environments, as indicated by the molluscan remains present within these units.

3.3.3 Phase 3: Silting up of river and lower alluvium

Silty clay deposits (facies 4) were encountered in the areas of low lying gravel above the possible foreshore deposits. These were restricted to the south of the site and in particular the northern boreholes, and were recorded between 1.33m to 2.03m OD. These deposits most likely represent seasonal overbank flood deposits from the nearby channel and the partially silting up of it and this proposed low energy foreshore area.

3.3.4 Phase 4: Active river channel or foreshore deposits (probably historic)

Deposits (contexts 109 and 112) similar to those highlighted in phase 2 above were located higher in the profile, between 1.8m to 1.9m OD, to the north of the site (PDZ2.24/25). Units of sands and sandy silts with occasional organic inclusions indicate a higher energy environment with a possible move from channel margin to actual channel bed or channel bar deposits.

3.3.5 Phase 5: Near channel mudflats

In the southern area of the site and located in the boreholes (NBHCZ2b-700 and 701) were brown humic silty clays (facies 5) at a height of 1.53m to 2.13m OD. These deposits may represent near channel wetlands associated with the channel deposits highlighted above. Although, seasonally flooded they shows signs of fine rooting and may represent a water meadow environment.

3.3.6 Phase 6: Silting up of river channel

Brown silty clay deposits (contexts 108 and 107) recorded in trench PDZ2.24/25 to a height of 2.36m OD are likely to represent the silting up of the watercourse and the development of a backwater or tidal creek, similar to that seen lower down and in the south of the site. More information about the environment represented by these contexts and their date might be obtained from the sample taken from them, which initially shows a dominance for plants from disturbed waste ground and wetland environments

3.3.7 Phase 7: Development of drier land surface

The uppermost alluvium recorded in the trench and boreholes (context 110 and facies 6) was weathered and likely to be of a result of episodic flooding of an otherwise dry land surface. It is likely to be of a recent date and variably across site the horizons of a buried topsoil (contexts 106 and 105) exist above this alluvial deposit. Most notably recorded in the trench at around 2.62m to 2.93m OD these horizons contain 19th Centaury pottery and CBM. These deposits probably represent a pre dump surface and may exist in the southern part of the site albeit in a disturbed nature.

3.3.8 Phase 8: Recent development

Trench PDZ2.24/25 has provided evidence for substantial quantities of material of recent date being deposited, either as a deliberate ground level raising event or possibly disposal of unwanted material. These two possibilities could indeed both be correct. These events may be associated with the construction of the adjacent riverside wall, with imported and dredged material being deposited behind a newly constructed bank side.

3.4 Evaluation of environmental evidence

3.4.1 Introduction

Several visits were made by a MoLAS-PCA geoarchaeologist to examine, record and sample the natural sequence. The geoarchaeologist's description and interpretation of the deposits form part of the trench results and stratigraphic interpretation in sections 3.2 and 3.3 above.

The stratigraphy recorded in a representative profile of the trench sequence, as drawn and described by the geoarchaeologist, should be entered into the MoLAS-PCA geoarchaeological stratigraphic database of the Lower Lea as part of the assessment. This database will be used in post excavation stages of the project, to reconstruct the evolving past environment of the Olympic site and to target samples and locations for analysis.

3.4.2 Sediment characteristics

A sequence of three monolith tins was taken through the natural deposit sequence at the north east end of Trench PDZ2.24/25 (OL-01707). Continuous U100 cores were taken from the Boreholes NBHCZ2b 700, 701 and 703. (OL-06407)

These tins and cores provide an undisturbed column of sediment, as revealed in the trench sections (where trenching occurred), for off-site examination. The location selected for sampling was considered to be a representative profile of the deposits exposed in the trench, or in the case of the boreholes the locations were selected to covered the footprint of the abandoned trench.

The monoliths and cores are suitable for sub-sampling for microfossils and sedimentary techniques, intended to gain a better understanding of the changing environments represented by the Holocene gravels and alluvial deposits across the site as a whole.

Sedimentary techniques such as loss on ignition, magnetic susceptibility and soil micromorphology might tell us more about the depositional and post depositional environment of the alluvial clay (contexts [106] to [110] in Trench PDZ2.24/25 (OL-01707)) in particular. Microfossil examination might be able to provide information about the river characteristics and surrounding vegetation.

The monoliths and cores will be retained until environmental assessment is undertaken, when sub-samples for pollen and diatoms will be examined to determine their potential for past environment reconstruction (see below). Further retention until the analysis stage of the project is likely to subsequently be required, as this is when more detailed sedimentary techniques will be carried out.

3.4.3 Microfossils

The clayey deposits recorded as contexts [108] to [110] Trench PDZ2.24/25 (OL-01707) and facies 3 and 4 (accumulated in possible alluvial to foreshore conditions) and [110] and facies 5 (accumulated as a result of episodic flooding of a relatively dry land surface) in Boreholes NBHCZ2b 700, 701 and 703. (OL-06407) might preserve microfossils, such as pollen and diatoms, as well as cladocera, chironomids and other microscopic remains. Such evidence can provide valuable information about the evolving past environment. In particular information about the past vegetation, water characteristics, and indirect evidence for human activity, such as landscape clearance, cultivation and other disturbance might be gleaned. Such evidence is likely to be complimentary to the information obtained from macro-remains from the bulk samples.

Preservation in the upper part of the alluvial clay ([110] and facies 4) may be poor, as a result of oxidation and weathering, however. The survival of plant macro remains was also relatively low in the creek or backwater deposits ([108] to [110] and facies 3 and 4), suggesting they might also have been subject to episodic drying out and weathering, which may lead to preservation of only the most durable pollen, spores and diatoms. This is only a guide - without assessment of the microfossil inclusions their survival and potential cannot be reliably evaluated and the preservation of microfossils in the deposits needs to be assessed as a further stage of work.

3.4.4 Bulk sample processing (Trench PDZ 2.24/25: OL-01707)

During excavations at trench PDZ 2.24/25 (OL-01707), three environmental bulk soil samples were collected for the potential recovery of macro-biological remains, for information on the character of the local environment and possible evidence of human activities in the area. Any such information could compliment the potential ecological

data from micro-biological material contained within monoliths sampled through sedimentary sequences at the site and establish possible spatial and temporal changes in the character of the environment on both a local and regional scale. The aim of the evaluation was simply to establish the presence and/or absence of biological remains and whether a full assessment of any such materials should be carried out.

The three samples were from fairly similar deposits; from silt clay sands, contexts [109] sample 4, and [108] sample 5, and alluvial silt clay sand, context [107], sample 6. The samples were 30 litres in size, with 15 litre sub-samples from each deposit being processed for the evaluation. Fourteen litres was floated onto a 0.25mm sieve with the residue from this fraction wet-sieved through a 0.5mm mesh while the other one litre was wet-sieved to 0.25mm. The flots were stored wet to prevent possible deterioration of any fragile organic material while the wet-sieved fractions were dried and sorted for any biological and artefactual materials; all the residues, however, were sterile in terms of environmental remains or finds.

A visual examination of the flots was carried out to establish the potential for the survival of different forms of biological evidence. Only 10% of the large flot from context [109] was scanned for the purpose of evaluation. The wet flots were divided into fractions by washing through a stack of sieves and scanned using a binocular microscope. A summary of the results is presented in Table 5.

3.4.5 Radiocarbon dating

Although some idea of the date of the deposits excavated has been inferred from their characteristics and level, no reliable date has yet been obtained for the sequence. Environmental evidence, unlike artefacts, is not intrinsically dateable and the information about the past landscape preserved in the deposit sequence means little unless it is tied in to an archaeological timeframe.

In general, few artefacts suitable for spot dating were recovered from the alluvial sequence (excepting the uppermost part of the alluvial clay). However, the deposits excavated contained twigs and other plant remains, from which radiocarbon dates might be obtained. A number of samples specifically for radiocarbon dating were taken ({2} from [109], and {3} from [105]), and the sequence of bulk samples (and the monoliths if necessary) should provide sufficient material for the extraction of single entity organic remains suitable for radiocarbon dating by AMS (Accelerator Mass Spectrometry).

3.4.6 Molluscs and ostracods (Trench PDZ 2.24/25: OL-01707)

Very occasional shells were present in the samples from contexts [107] and [109].

3.4.7 Plant remains (Trench PDZ 2.24/25: OL-01707)

All three flots produced organic remains although samples from [108] and [107] only contained small flots of 5ml and 10ml respectively; sample 4 (context [109]), on the other hand, produced a large flot in excess of 400ml. The main component of all three flots was roots/rootlets, which dominated the two smaller flots from [107] and [108], while small amounts of very fragmented charcoal were noted in contexts [107] and [109] (the latter also containing some very fragmented wood).

Identifiable fruits and seeds were present in all three samples although the two smaller flots from contexts [107] and [108] only produced a low number of identifiable items, with disturbed and waste ground species, eg. elder (*Sambucus* sp.) and goosefoots (*Chenopodium* spp.), and wetland plants, eg sedges (*Carex* spp.) and crowfoots (*Ranunculus Batrachium* gp), being represented. There was an interesting find, however, of several grape (*Vitis vinfera*) pips in the sample from [107]. The large flot from [109] produced a large number of identifiable seeds and fruits, with high species diversity, and a good representation of wetland (including aquatic) plants, eg. pondweeds (*Potamogeton* spp.), water plantain (*Alisma* spp.), sedges, crowfoots, and also disturbed/waste ground plants, eg. elder, stinging nettle (*Urtica dioca*) and *Polygonum* species.

3.4.8 Insect remains (Trench PDZ 2.24/25: OL-01707)

Only the sample from [109] produced insect remains with a moderate amount of beetle fragments being noted in the scanned fraction of the flot.

context	sample	soil processed (l)	soil retained (l)	Vol washed material (ml)	Wood/roots	Seeds/fruits	insects	molluscs	comments	Potential
109	4	15	15	400	Wood fgs (small) ++ Roots+++ charcoal++	+++ (cype,car,ali,ptm,rba,men,sam,pap,umbe,pol,urtdi)	++	+	>roots; >seeds (wet & dist gd) mod beetles	Rich seeds, mod beetles
108	5	15	15	5	Roots+++	+ (sam,car,ranba)			Mainly roots few seeds	poor
107	6	15	15	10	roots+++ charcoal++	++ (vitvi,che,plama)		+	Mainly roots	poor

Table 5 Evaluation of environmental remains in the bulk samples

3.5 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, observation of the deposit sequence of archaeological interest was hampered by rapid water ingress, owing to its proximity to several rivers, and contamination issues. Further clarification of the evaluation results, involving work on the samples and dating, in particular, is needed to be confident in the interpretations presented. In order to understand the archaeological significance of the deposits it will also be necessary to place the results in the context of the stratigraphic sequence recorded in nearby trenches and boreholes. However, the stratigraphic sequence and deposit characteristics as discussed above are internally consistent.

In addition, sampling for environmental evidence was not as comprehensive as would usually be undertaken, owing to contamination issues during excavation. However, the stratigraphic sequence and deposit characteristics as discussed above are considered to be an accurate record of the deposits existing on the site.

The evaluation has revealed thick deposits of 19th–20th century made-ground, associated with the construction or maintenance of adjacent waterways. These modern deposits overly an earlier sequence of bioturbated soil; alluvial clays and silts, sandy silts and gravel topography.

4 Archaeological potential

4.1 Realisation of original research aims

The extent to which the evaluation has been able to address the research objectives established in the Method Statement for the evaluation is discussed below.

What is the potential for Late Glacial environment reconstruction and/or Late Upper Palaeolithic activity in the Pleistocene deposits on the site?

Deposits of possible Pleistocene date were probed and no samples were recovered. As a result, there is no potential for obtaining information about Late Upper Palaeolithic activity or environment. The potential is limited to contributing to the topographic reconstruction, when amalgamated with other relevant data from across the Olympic park.

What evidence exists for past river channels on the site and how does this contribute to our understanding of the origin of the modern and historic River Lea, Waterworks River and City Mill River, which form the boundaries of the site?

The evidence identified in this excavation demonstrates riverine and foreshore environments, along with near channel wetlands and overbank flooding associated with fluctuating water levels. A date from the lowest deposits in conjunction with scrutiny of historic map evidence and deposit modelling during the assessment stage of the project might be able to shed light on the relationship of this channel to the development of the historic River Lea, Waterworks River and City Mill River.

Can episodes of channel activity and abandonment be dated?

Seeds and twigs suitable for radiocarbon dating were preserved within the active watercourse deposits ([109]) and those representing its silting up ([108] and [107]). Radiocarbon dates from these deposits would provide a date for the episodes of channel activity and abandonment observed.

What potential is there for reconstructing the evolving river regime from environmental samples taken from the site?

Evidence for former river channels that crossed the trench comprised sands, overlain by sandy silts and silty clays. Coarse to fine foreshore deposits accumulated as bars on the riverbed or the margins of the channel ([109], [112] and facies 3) were overlain by the silty clay of a muddy creek or backwater ([107], [108] and facies 4 and 5).

Further information about the characteristics of this watercourse might be obtained by examination of environmental micro-and macrofossils preserved in the bulk and monolith samples taken from the deposits.

Is there evidence of past human activity associated with river exploitation or management? In particular, does evidence of wetland / stream exploitation exist that may be contemporary with the prehistoric activity previously found on the low terrace (at Warton Road)?

The only evidence for past human activity associated with river exploitation or management that was seen during the evaluation was the 19th-20th century levelling/infilling deposits that may be associated with the present river systems. Due to waterlogging of the trench, it was not possible to fully sample the relevant alluvial clay and gravel deposits.

What environmental evidence suitable for past landscape reconstruction exists within deposits associated with ancient channels of the River Lea and/or its tributaries? In particular, to what extent can environmental remains preserved within the alluvial deposits provide complimentary information to the archaeological evidence from Warton Road?

Environmental evidence suitable for past landscape reconstruction may exist within the alluvial clay, organic and gravel deposits recorded during the evaluation. The final phase of these deposits are likely to be associated with the adjacent Waterworks River.

Further work on monolith samples (such as an examination of pollen and diatoms), as well as from the bulk samples (where molluscs in particular may be preserved) may help reconstruct the historic characteristics of the floodplain environment and of the river channel itself.

Is there any evidence of a Roman road and/or occupation activity within the area of the site? If so, how does it relate to what is known of the settlement pattern further south in the Stratford Market area during the Roman period?

No evidence of the Roman road or occupational activity was found during this evaluation. The deposits which predate the final infilling phase all appear to have formed in a marginal or waterlogged environment. This would suggest that the area was not suitable for occupation.

What evidence for medieval/post medieval land use exists within the site area, including industrial and agricultural evidence?

No evidence for medieval landuse was found in the evaluation. The final deposits that seal the naturally derived sediments are all likely to originate in post medieval levelling episodes associated with construction and/or embanking of the Waterworks River.

How extensive is modern truncation and how thick is modern made ground across the site?

Trench PDCZ2.24/25 did not reveal any evidence of modern truncation and it seems likely that post medieval activity has concentrated on trying to raise the ground surface level.

4.2 General discussion of potential

The evaluation has shown that a sequence of alluvial deposits of archaeological interest survives below about 3.0m OD and sealed by roughly 3m of 19th and 20th century made ground in the vicinity of PDZ2.24/25. The lower part of this alluvial sequence (below about 1.5m OD) was not sampled, or examined in any detail because of rapid water ingress and contamination issues. However, a tentative interpretation of this lowest part of the sequence and a more robust interpretation of its upper part,

together with the collection of a sequence of bulk and monolith samples from the deposits above *c* 1.5m OD was made.

Preliminary interpretations suggest that a watercourse formerly crossed the site. Evidence of a possible prehistoric watercourse may exist in the south of the site where the gravel surface is lowest. However, no trenching was carried out in this part of the site and the deposits were not extensively uncovered. Although as yet undated, these deposits might be dated by radiocarbon, as the sands and silts that accumulated on the riverbed or channel margins may contain abundant seeds and other plant remains suitable for radiocarbon dating, which could be subsampled from the retained borehole cores.

A historic watercourse may be evident in PDZ2.24/25 and may be related to one previously highlighted in PDZ2.21 (OL-01707). have migrated (or been diverted) across an area of dry ground, which a test pit in the south west part of the trench suggests had previously existed here. No sondage or test pit was excavated to sufficient depth to examine the deposits underlying and/or those relating to the watercourse in any detail and they were primarily recorded through augering the base of the trench.

The height and characteristics of the upper foreshore or channel bar deposits that indicate the later watercourse suggest they could be of historic age. Although as yet undated, the watercourse might be dated by radiocarbon, as the gravels and sands that accumulated on the riverbed or foreshore contain abundant seeds and other plant remains suitable for radiocarbon dating. These plant remains, together with insects and snails also preserved within the samples taken from the active channel deposits have potential to reconstruct the characteristics of the river and the surrounding environment.

A sequence of mollusc-rich silty clay deposits overlying the sands indicate that the watercourse silted up and became a creek or backwater. Microfossils (in particular diatoms and pollen) could be preserved within these fine-grained sediments that might provide information about the changing characteristics of the river, as well as vegetation and landuse in the surrounding area.

When the stratigraphic information from PDZ2.24/25 has been tied in with the information recovered from the surrounding area (by inputting the data into the MoLAS-PCA geoarchaeological database for the Olympic Project), linked to historic map evidence and dated it could have potential to contribute to our understanding of the evolving river regime of the Lower Lea.

Depending on the results of dating, it might also provide useful information about vegetation change and the changing environment of the Olympics Site during the historic period. Such information would be of real value, as environmental evidence is poorly preserved within the (typically weathered) alluvial clay that in general accumulated across the floodplain in historic time.

4.3 Significance

The archaeological remains discovered on the site are undoubtedly of local significance, as they contribute to our understanding of the past river pattern and its

characteristics. However, there is nothing to suggest that they are of regional or national importance.

Further work on the environmental samples taken from the site should clarify the date and environments represented by the active and silting-up river channel deposits. When their date is known, and taken together with the results of other sites within the Olympics footprint, the results have potential to be regionally significant.

5 Assessment by EH criteria

The recommendations of the GLAAS 1998 guidelines on *Evaluation reports* suggest that

'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 guidelines 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 guidelines 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' (Annex 4, DOE 1990). For detailed definition of the criteria see that document.

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 the site is characteristic of the prehistoric and recent periods. The Evaluation indicates a multi period site.

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 documentary records for remains in the area from the early (prehistoric) period.

Criterion 4: group value

None of the likely archaeological deposits are associated with contemporary single monuments external to the site. However, further and ongoing archaeological work on the Olympic site will establish context.

Criterion 5: survival/condition

The evaluation results have demonstrated that archaeological remains will be preserved beneath several metres of modern made ground, although within areas of development will have been truncated to dramatically different levels.

Criterion 6: fragility

Experience from other sites has shown that isolated and exposed blocks of stratigraphy can be vulnerable to damage during construction work.

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

(the term Potential in this context appears to mean that though the nature of the site, usually below-ground resources, cannot be specified precisely, it is possible to document reasons predicting its existence and importance)

The evaluation has shown that deposits of alluvium overlying late Pleistocene gravels exist in the local vicinity. Further examination of samples already taken from the alluvial deposits on the site hold the potential to enhance current understanding of the natural and manmade environment of this part of the Lea Valley from the early prehistoric to modern periods.

6 Proposed development impact and recommendations

It is proposed to construct a coach parking and drop-off area and ancillary spectator facilities on the site. This will involve laying of services, service diversions and service protection works; construction of vehicle crossovers, ramp and junction realignments; installation of a telecommunication mast and construction of an ancillary compound; construction of bridges numbered F09 and F010b (west side) including decks and substructures. Although much of this work will not extend below the base of the modern made ground, some works, in particular the services and those requiring foundations such as the bridge and vehicle crossovers will impact upon the depositional sequence and any remaining archaeological features. These may be subject to a separate phase of archaeological investigation at an as-yet unspecified future date. Such works will at the very least disturb and partially destroy any archaeological deposits.

The assessment above (Section 5) does not suggest that preservation *in situ* would be the only appropriate mitigation strategy and GLAAS has determined that no further excavation within the site is necessary, for the present impact, but that collected environmental samples be subject to detailed examination as part of the mitigation.

Initial evaluation of the samples collected suggests they have good palaeoenvironmental potential. In particular, the bulk samples contain identifiable seeds and some molluscs, and if dated both bulk and monolith samples might preserve useful information about vegetation change and the changing environment of the Olympics Site from a time when environmental evidence is typically poorly preserved. Radiocarbon dating, microfossil and macrofossil assessment from the borehole cores might also provide information about the earlier floodplain environment.

In order to clarify the potential of the samples taken and to refine the research aims they might be able to address, it is recommended that:

- Five litres of each of the unprocessed sample from [109] together with contexts [8] and [9] be processed by paraffin flotation for the assessment of insect remains (3 samples);
- Five litres of each of the unprocessed samples be wet sieved and together with the wet-sieved fractions of the parts of samples already processed, examined to assess the potential of the snail and ostracod assemblages preserved. Bulks from core sample contexts [8], [9], and [10] should also be assessed for snail and ostracods (6 samples);
- Five litres of each of the unprocessed samples be floted and the flots (together with those already processed) and with half core samples from contexts [7], [8], [9], [10] and [11] assessed for plant remains (8 flots);
- Four radiocarbon dates are obtained by AMS on identified twigs, seeds or other plant material from the foreshore sands and silts ([109]), the organic deposit [108]; and facies 3 and 5 from NBHCZ2b-701;

- Pollen and diatom assessment of the stratigraphic sequence is undertaken (8 sub-samples for each to be cut from the monolith tins plus 8 Sub-samples for each to be cut from NBHCZ2b-700)
- The stratigraphic, dating and sample assessment data is entered into the MoLAS-PCA geoarchaeological stratigraphic database and used to update the current GIS models of the past topography and environment, to contribute to the environmental assessment of PDZ2;
- Research aims that might realistically be addressed by the samples are identified and a report prepared by a geoarchaeologist or environmental archaeologist, summarising the environmental assessment results and the potential of the samples collected from the site.

It is also recommended that the results of this evaluation and of the proposed environmental mitigation are assimilated into a site-wide assessment of all archaeological interventions to assign contextual significance and further refine the importance of the archaeological survival, and thereafter assimilated into any publication discussing/disseminating the results.

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

7 Acknowledgements

MoLAS-PCA would like to thank the Olympic Delivery Authority for commissioning the investigations at PDZ2, and the staff at Atkins, CLM, Edmund Nuttall Ltd and Capita Symonds Ltd for their assistance in site set-up and operation; David Divers (English Heritage, GLAAS) monitored the project on behalf of the London Borough of Newham and PDT.

The fieldwork stage of the project was managed by Gary Brown. The authors would like to thank Kieron Tyler for the project management of the reporting stage and Frank Meddens for the editing of the text. Graphics were prepared by the PCA graphics team. On site geoarchaeological investigation was undertaken by Tom Hoyle and Virgil Yendell who contributed to this report. Survey for MoLAS-PCA was carried out by Phil Frickers. In addition, thanks are due to the ground crew from Edmund Nuttall Ltd for their cooperation and assistance during the project.

8 Bibliography

Department of the Environment, 1990 *Planning Policy Guidance 16, Archaeology and Planning*

English Heritage, 1991 *Exploring Our Past, Strategies for the Archaeology of England*

English Heritage, May 1998 *Capital Archaeology. Strategies for sustaining the historic legacy of a world city*

English Heritage, 1991 *Management of Archaeological Projects (MAP2)*

English Heritage Greater London Archaeology Advisory Service, June 1998 *Archaeological Guidance Papers 1-5*

English Heritage Greater London Archaeology Advisory Service, May 1999 *Archaeological Guidance Papers 6*

English Heritage, 2002, *Environmental Archaeology: a guide to the theory and practice of methods, from sampling and recovery to post-excavation*

English Heritage, 2004, *Geoarchaeology: using earth sciences to understand the archaeological record*

Institute of Field Archaeologists, (IFA), 2001 *By-Laws, Standards and Policy Statements of the Institute of Field Archaeologists, (*rev. 2001), *Standard and guidance: field evaluation*

Institute of Field Archaeologists (IFA), supplement 2001, *By-Laws, Standards and Policy Statements of the Institute of Field Archaeologists: Standards and guidance – the collection, documentation conservation and research of archaeological materials*

Museum of London, 1994 *Archaeological Site Manual 3rd edition*

Museum of London, 2003 *A research framework for London archaeology 2002*

MoLAS-PCA, 2006. 'Written Scheme of Investigation for an Archaeological Evaluation of Planning Delivery Zone 2a, London Borough of Newham. MoLAS-PCA Unpublished report.

MoLAS-PCA. 2007a. Lower Lea Valley Regeneration and Olympics Planning Delivery Zone 2. London Borough of Hackney. An Archaeological and Built Heritage Impact Assessment. MoLAS-PCA Unpublished Report

MoLAS-PCA. 2007b. Method Statement for an Archaeological Evaluation of Planning Delivery Zone 2. MoLAS-PCA Unpublished Report

9 Appendix 1: NMR OASIS archaeological report forms

9.1 OL-01707

OASIS ID: molas1-40649

Project details

Project name	Olympic Site, Work Packages 3 and 5, Planning Delivery Zone 2.
Short description of the project	MoLAS-PCA carried out a single trench evaluation on the site of work packages 3 and 5 within the Olympic, Paralympic Games and Legacy Transformations Planning Applications: Planning Delivery Zone 2, London Borough of Newham, London E15. Following the recommendations of the previous Desk-Based Assessment an evaluation trench was excavated on the site between 12/3/2008 and 19/3/2008. The trench (PDCZ2.24/25) has provided evidence for the survival of alluvial clays, sandy clays and sands and gravels.
Project dates	Start: 12-03-2008 End: 19-03-2008
Previous/future work	No / Not known
Any associated project reference codes	OL-01707 - Sitecode
Type of project	Field evaluation
Site status	Local Authority Designated Archaeological Area
Current Land use	Industry and Commerce 1 - Industrial
Methods & techniques	'Environmental Sampling','Targeted Trenches'
Development type	Large/ medium scale extensions to existing structures (e.g. church, school, hospitals, law courts, etc.)
Development type	Land reclamation/de-contamination
Development type	Olympic development
Prompt	Planning condition
Position in the planning process	After full determination (eg. As a condition)

Project location

Country	England
Site location	GREATER LONDON NEWHAM STRATFORD Work Packages 3 and 5, Planning Delivery Zone 2.
Postcode	E15
Study area	0.20 Kilometres
Site coordinates	TQ 537100 186125

Project creators

Name of Organisation	MoLAS/PCA
Project brief originator	MoLAS project manager
Project design originator	MoLAS/PCA
Project director/manager	Nick Bateman
Project supervisor	John Payne
Type of sponsor/funding body	ODA

Project archives

Physical Archive recipient	LAARC
Physical Archive ID	OL-01707
Physical Contents	'Environmental'
Digital Archive recipient	LAARC
Digital Archive ID	OL-01707
Digital Contents	'Environmental'
Digital Media available	'Images raster / digital photography','Survey'
Paper Archive recipient	LAARC
Paper Archive ID	OL-01707
Paper Contents	'Environmental'
Paper Media available	'Context sheet','Plan','Report','Section'

Project bibliography 1

Publication type	Grey literature (unpublished document/manuscript)
Title	Work Package 2, Planning DElivery Zone 2.
Author(s)/Editor(s)	Payne. J
Date	2008
Issuer or publisher	MoLAS
Place of issue or publication	MoLAS

Entered by	jpayne@pre-construct.com
Entered on	

9.2 OL-06407

OASIS ID: molas1-49038

Project details	
Project name	Olympic Site, Work Packages 3 and 5, Planning Delivery Zone 2.
Short description of the project	Three geoarchaeological boreholes (NBHCZ2b-700, 701 and 702) were drilled to replace trench PDZ2.19, which could not be excavated owing to the thickness of made ground. Preliminary interpretations suggest that a watercourse formerly crossed close to the boreholes at c. 1m to 1.5m OD. Evidence of a later nearby watercourse was also located to the north in PDZ2.24/25. Although as yet undated, the watercourses might be dated by radiocarbon, as the silts and sands that accumulated on the riverbed or channel margins contain seeds and other plant remains suitable for radiocarbon dating.
Project dates	Start: 01-06-2008 End: 30-06-2008
Previous/future work	Yes / Not known
Any associated project reference codes	OL-06407 - Sitecode
Any associated project reference codes	molas1-40649 - OASIS form ID
Any associated project reference codes	molas1-40642 - OASIS form ID
Type of project	Field evaluation
Site status	Local Authority Designated Archaeological Area
Current Land use	Other 13 - Waste ground
Monument type	PALAEOCHANNEL Uncertain
Monument type	ALLUVIUM Uncertain
Methods & techniques	'Augering','Environmental Sampling'
Development type	Olympic and Parlympic Development and Facilities
Prompt	Planning condition
Position in the planning process	After full determination (eg. As a condition)
Project location	
Country	England
Site location	GREATER LONDON NEWHAM STRATFORD Work Package 4, Planning Delivery Zone 2.

Postcode	E15
Study area	2.00 Hectares
Site coordinates	TQ 38025 84032 51.5377939509 -0.00960295171474 51 32 16 N 000 00 34 W Point
Height OD / Depth	Min: 0.58m Max: 1.17m
Project creators	
Name of Organisation	MoLAS/PCA
Project brief originator	MoLAS project manager
Project design originator	MoLAS/PCA
Project director/manager	Nick Bateman
Project supervisor	Virgil Yendell
Type of sponsor/funding body	ODA
Project archives	
Physical Archive recipient	LAARC
Physical Contents	'Environmental','other'
Digital Archive recipient	LAARC
Digital Contents	'other'
Paper Archive recipient	LAARC
Paper Contents	'Environmental','Stratigraphic','Survey'
Paper Media available	'Context sheet','Drawing','Report','Unpublished Text'
Project bibliography 1	
Publication type	Grey literature (unpublished document/manuscript)
Title	Work Package 4, Planning Delivery Zone 2.
Author(s)/Editor(s)	'Payne, J.'
Author(s)/Editor(s)	'Yendell, V.'
Date	2008
Issuer or publisher	MoLAS
Place of issue or publication	London
Description	A4 black and white document, spiral bound, also digital versions,

	colour figures and front cover
Entered by	vyendell (archive@molas.org.uk)
Entered on	30 September 2008

10 Appendix 2: Glossary

Alluvium. Sediment deposited by a river, and usually well sorted. Can range from sands and gravels deposited by fast flowing water and clays that settle out of suspension during overbank flooding. Other deposits found on a valley floor are usually included in the term alluvium. Peat develops when there is little mineral sediment deposition and impeded drainage, which limits biological decay; and tufa accumulates when springs rich in calcium carbonate discharge in damp well-vegetated situations.

Arctic Beds. Cold climate deposits, pre-dating the Last Glacial Maximum and sometimes found within the gravels of the Lower Lea. They may survive within parts of the floodplain not reworked by the river during the Late Glacial.

Ecotone. A zone that lies between areas of contrasting environment, such as on the wetland/dryland margins.

Holocene. The most recent epoch (part) of the Quaternary, covering the past 10,000 years during which time a warm interglacial climate has existed. Also referred to as the 'Postglacial' and (in Britain) as the 'Flandrian'.

Knickpoint. A fall in base level (such as the low sea level at the end of the Pleistocene) gives rise to a discontinuity in the longitudinal profile of a river ie: steepening of the downstream channel gradient. The river tends to adjust to such a change by increased flow, which leads to increased erosion in the steepened section of the river and this results in the steepened section (knickpoint) cutting back in an upstream direction.

Last Glacial Maximum. The height of the glaciation that took place at the end of the last cold stage, around 18,000 years ago.

Late Glacial. The period following the Last Glacial Maximum and lasting until the climatic warming at the start of the Holocene. In Britain this period is subdivided into a warm 'interstadial' episode the Windermere Interstadial, followed by a renewed cold ('stadial') episode, in which local ice advances occurred (the Loch Lomond Stadial).

Pleistocene. Used in this report to refer to the earliest part of the Quaternary, the period of time until the start of the Holocene, about 10,000 years ago. However, since the present Holocene epoch is almost certainly only a warm interglacial episode within the oscillating climate of the Quaternary, it is often seen as being part of the Pleistocene epoch, in which case the terms Pleistocene and Quaternary are interchangeable. As it is necessary, in this report, to differentiate between the events that took place at various times during the last cold stage and earlier in the Quaternary and those that took place during the Holocene, the Pleistocene is used to refer to the parts of the Quaternary pre-dating the climatic amelioration that took place at the start of the Holocene.

Quaternary. The most recent major sub-division (period) of the geological record, extending from around 2 million years ago to the present day and characterised by climatic oscillations from full glacial to warm episodes, when the temperate was as warm as if not warmer than today. To a large extent human evolution has taken place within the Quaternary period.

11 Appendix 3: Finds assessment

11.1 Pottery and CBM spot dating

Frank Meddens

11.1.1 Introduction

There are a total of two sherds of pottery (stratified) from site OL-01707, both from the same vessel and dating to the late post-medieval period. The pottery is in a good condition indicating it was deposited soon after breakage. The material has been classified following the standard Museum of London pottery codes and was recorded in a database.

Table 6 shows the distribution of the pottery in the context it was recovered from, the number of sherds and a spot date for the deposit.

Context	Sherd count	Spot date	FABRIC	Vessel shape
105	2	1880–1950	REFW	CUP TEA

Table 6: PDZ2.24/25 ceramic spot dating index

11.1.2 Significance, potential and recommendations for further work

There is little significance to the pottery and it is mundane for the period. The pottery represents a common 1st half of the 20th century teacup. The potential for the pottery is that it serves to date the context it derives from. There are no recommendations for further work.

11.1.3 CBM

A single fragment of post-medieval pan tile was present in [106]. Its condition is very worn and it is likely to be re-deposited. Pan tile was fashionable in the late 17th to 18th centuries.

The fragment is of little significance. It is re-deposited and there are no recommendations for further work on this piece.

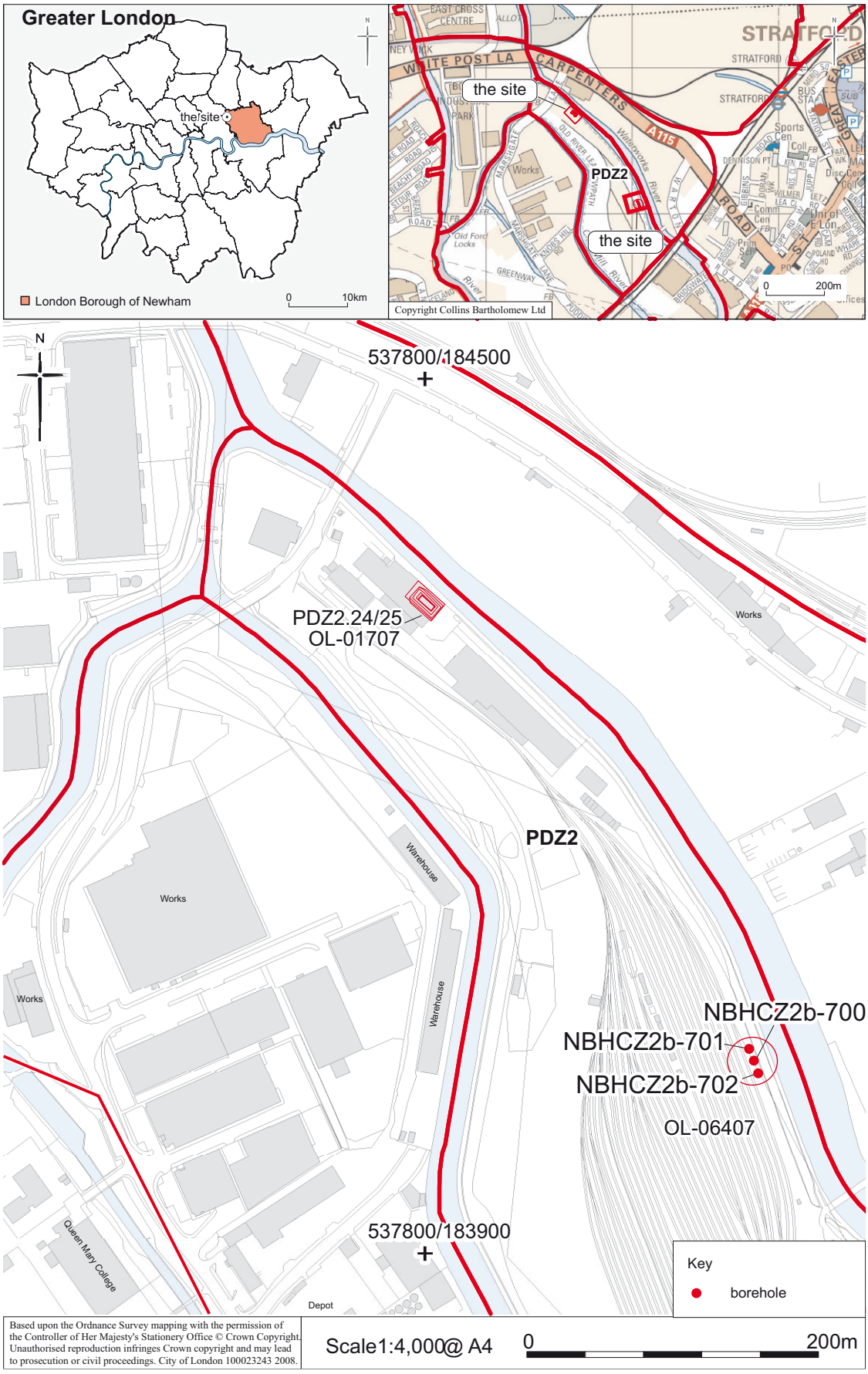

Fig 1 Location map

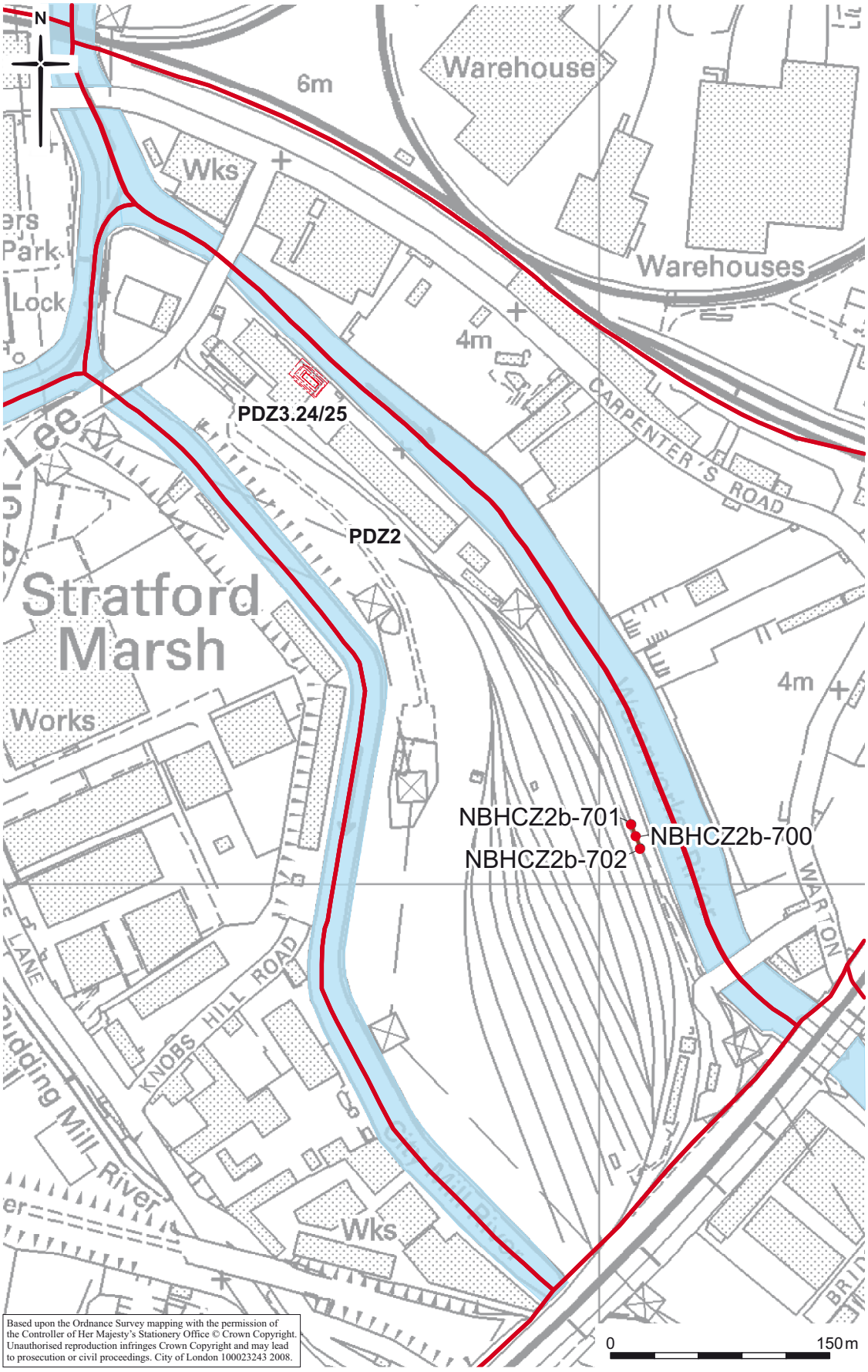

Fig 2 Trench locations

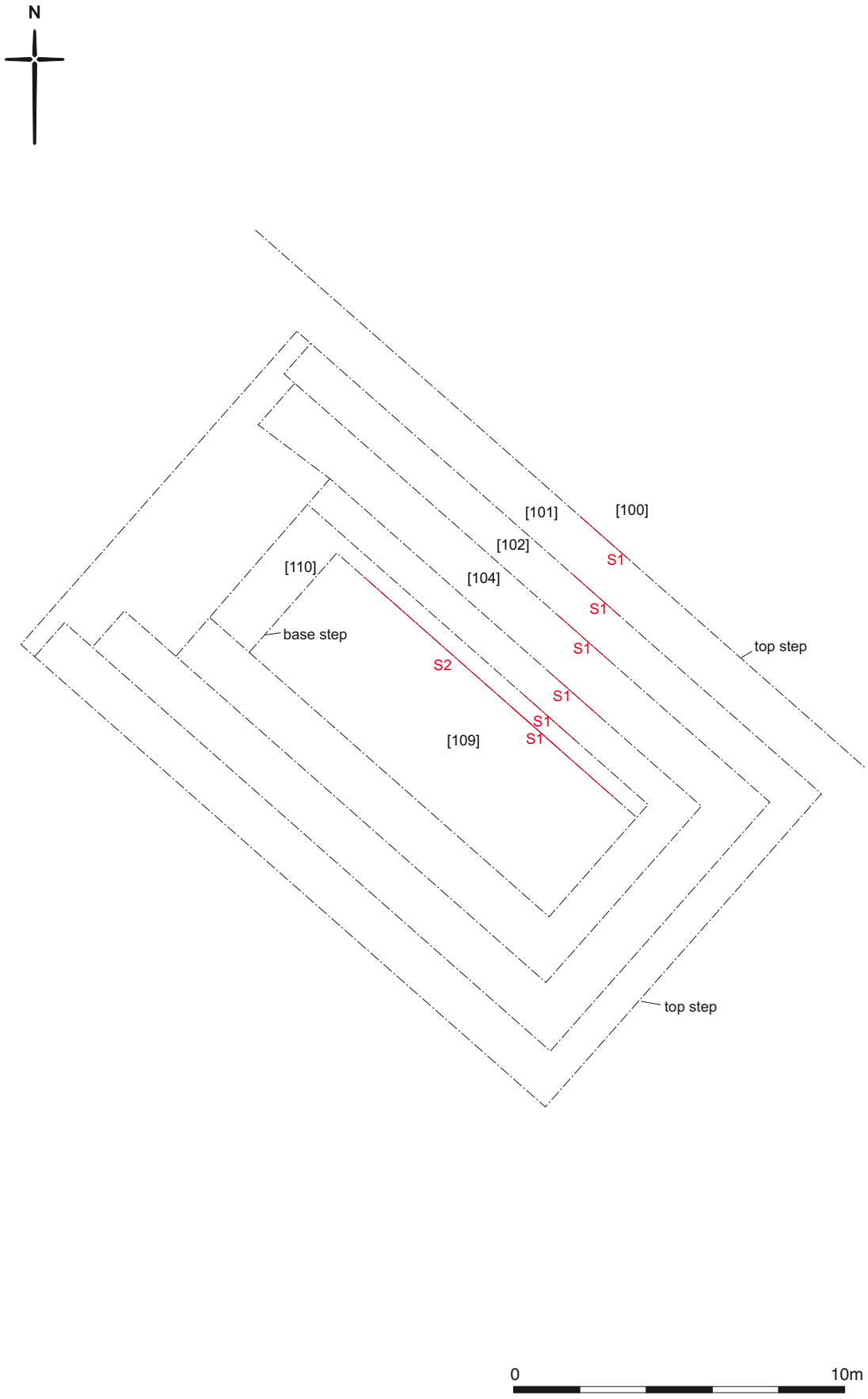

Fig 3 Plan of Trench PDZ2.24/25

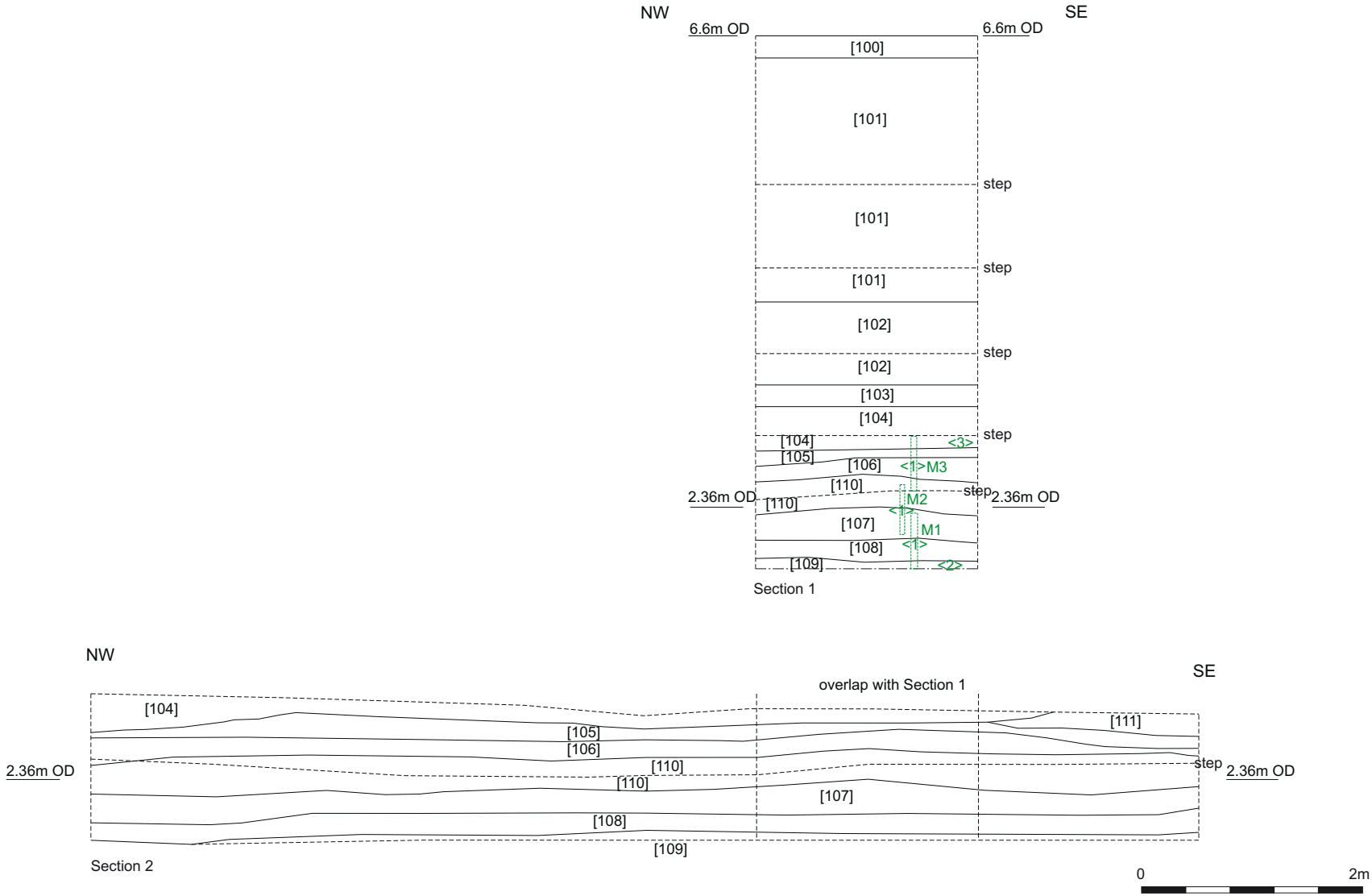

Fig 4 Trench PDZ2.24/25, south-west facing sections 1 and 2

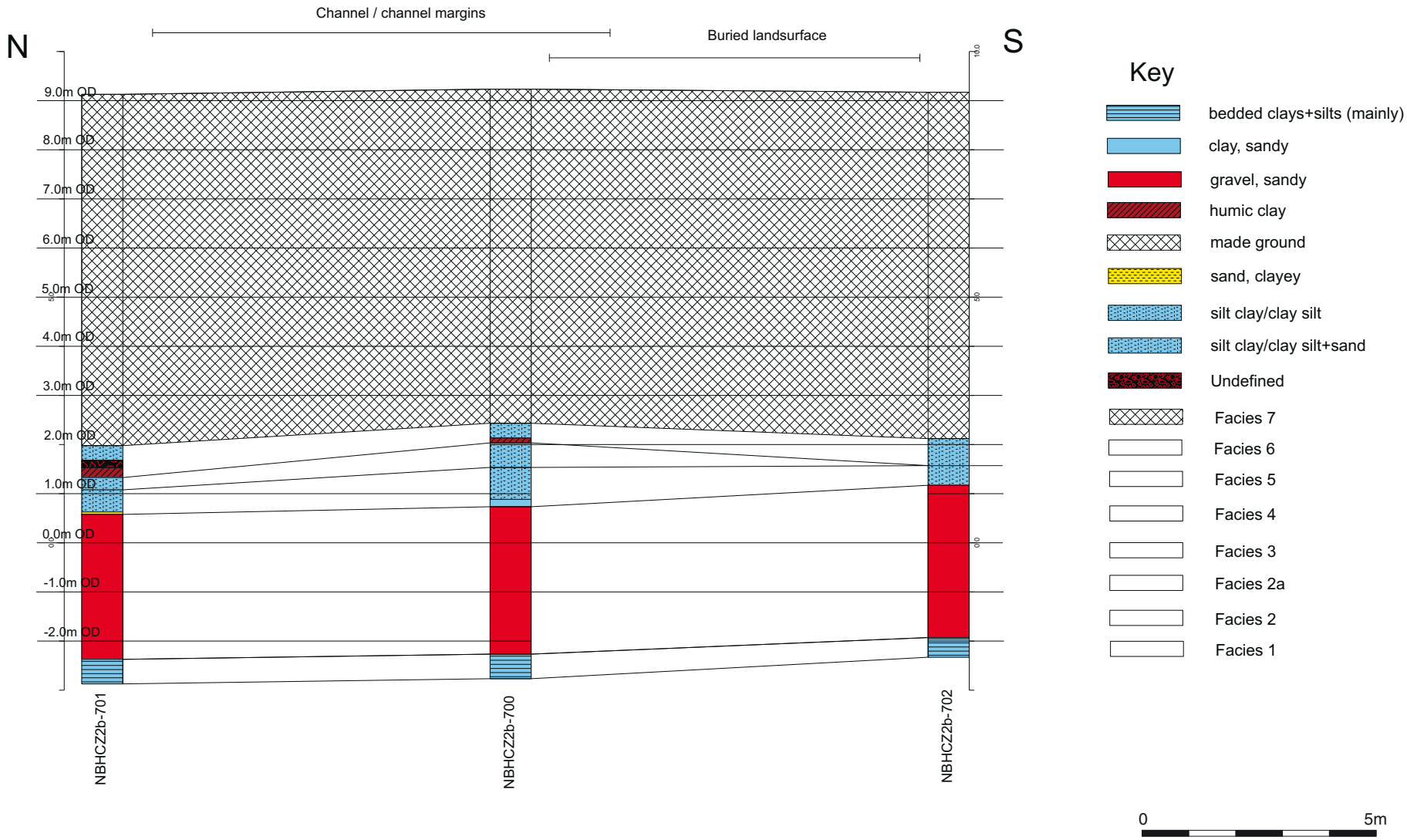

Fig 5 North-south transect through boreholes NBHCZ2b-700, 701, 702