



**PLANNING DELIVERY ZONE 6**  
**Work package 6**  
**Trenches PDZ6.28**  
**PDZ6.35**  
**E15**

London Borough of Newham

A report on the evaluation

November 2008



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Site Code: OL-08908  
National Grid Reference: 537710 184960

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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) within the Olympic, Paralympic and Legacy Transformations Planning Applications: Planning Delivery Zone 6 (work package 6) 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, two evaluation trenches (PDZ6.28, and PDZ6.35) were excavated in PDZ6, Works Package 6, on either side of the Channelsea river. The results have helped to refine the initial assessment of its archaeological potential. The trenches were excavated to the level of the natural gravels, which in trench PDZ6.28 were overlain by a soft sandy gravel containing later Roman pottery fragments. In both trenches the gravels were overlain by an alluvial sequence of sands and silty clays, initially organic but becoming less so with height. Furrows cut the surface of the alluvial deposits and relict topsoils survived. These deposits were subsequently sealed in both trenches by 19th–20th century made ground.*

*There is good potential for past environment reconstruction from seeds, snails, insects, ostracods and microfossils, in particular pollen and diatoms. There is also good potential for radiocarbon dating to clarify the timing of river activity and wetland development. Inputting the stratigraphic information into the Olympics geoarchaeological database and modelling the semi interpreted data in ARC GIS is recommended.*

*Further fieldwork is unlikely to provide significant additional information about the archaeological remains surviving on the site. However, further archaeo-environmental work on the samples already taken from the site is necessary to assess their potential for past landscape reconstruction. Such off-site work would provide adequate mitigation of the geoarchaeological resource. It is also proposed that the results of this evaluation are assimilated into a project-wide assessment of all archaeological interventions to assign contextual significance and further refine the importance of the archaeological survival. Thereafter the information gained could be assimilated into any publication discussing/disseminating the results.*

*The decision on the appropriate archaeological response to the deposits existing on the site rests with the Local Planning Authority and their designated archaeological advisor.*

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# 1 Introduction

## 1.1 Site background

Archaeological evaluation was undertaken within Planning Delivery Zone 6 (PDZ6), of the Olympic, Paralympic and Legacy Transformations Planning Applications, in the London Borough of Newham.

PDZ6 is bounded on the west by the River Lea, on the east by the former Eastern Counties Railway line from Stratford to Cambridge, on the north by Temple Mills Road and on the south by Temple Mills Lane, the Clays Lane Estates and the channels of the Channelsea River at the south-western corner. The former Eastway Cycle Circuit occupied the majority of the zone, apart from the western section of the Clays Lane Estate.

The evaluation of PDZ6 was broken down into a series of Work Packages, each defined due land availability and project programming. This report deals with Work Package 6, two trenches in an area bounded to the to the west and north-west by former allotments; to the north-east by the former Eastway Cycle Circuit; to the south-east by former cold stores, and to the south by Bully Point Pond Nature Reserve. Other evaluation Work Packages in PDZ6 are reported on separately (to date, under site codes OL-01407 and OL-07907) This report deals with Work Package 6, hereafter called 'the site' (Fig 1).

The National Grid Reference (NGR) for the centre of PDZ6, Work Package 6 is 537710 184960. The footprint of Work Package 6 was defined by local property boundaries, and the limits of areas within which access was possible to excavate the evaluation trenches. Effectively, the footprint of Work Package 6 was delimited as a tool for defining the location and potential maximum extent of the group of trenches (Fig 1). Ground level across both trench areas varies from approximately 5.34m OD to 11.78m OD. The site code allocated to PDZ6 Work package 6 is OL-08908.

The proposed development of the evaluated site involves the construction of Bridge F05, which is anticipated to impact upon the archaeological resource (MoLAS-PCA 2007b). The trenches were undertaken to assess the potential of the area that would be impacted upon by this development work, and were positioned as such.

A *Desk-Based Assessment* was undertaken for PDZ6 (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 *Method Statement* was prepared for PDZ6 (MoLAS-PCA 2007b), which forms the project design for the evaluation.

## 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 of PDZ6 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 Planning Authority can formulate responses appropriate to any identified archaeological resource.

The evaluation of the subject site in PDZ6 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 Capita Symonds Ltd on behalf of the Olympic Delivery Authority 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 the most recent English Heritage guidelines (English Heritage, 1998) as intended to provide information about the archaeological resource in order to contribute to the:

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

### 1.5 Aims and objectives

The following research aims and objectives for PDZ6 were established in the *Method Statement* for the evaluation (MoLAS-PCA 2007b) and are intended to address the

research priorities established in the Museum of London's *A research framework for London Archaeology* (2002). They are set out below.

- Do Kempton Park Gravels exist in the extreme eastern part of the zone? What is the potential for past environment reconstruction from these deposits?
- Do deposits pre-dating the Last Glacial Maximum, which might correspond with the Arctic Beds, exist within or below non-reworked gravels in the eastern parts of the zone (Landscape Zone 1)? What is the potential for past environment reconstruction and/or Late Upper Palaeolithic activity in these deposits?
- What is the potential for dating (e.g. OSL or radiocarbon dating) the sandy clay /clayey sand deposit that lies above the gravels of the Low Terrace in the eastern part of the zone (Landscape Zone 1)? Can the depositional environment of these deposits be interpreted?
- Do Late Glacial deposits exist within re-worked gravels in the southwest part of the zone (Landscape Zone 3)? What is the potential for past environment reconstruction and/or Late Upper Palaeolithic activity in these deposits?
- Do slope deposits of Pleistocene and/or Holocene origin overlie Pleistocene gravel in the eastern part of the zone? What direct or indirect evidence of past human activity is associated with the colluvium?
- Did the Leyton River cross the zone in the Pleistocene or Holocene and is there evidence for human activity associated with the river?
- Can channels of the River Lea be distinguished from its tributaries in the south-western part of the zone? Does evidence for human activity, similar to that found in the Stratford Box, associated with the river, survive?
- What environmental evidence suitable for past landscape reconstruction exists within deposits associated with ancient channels of the River Lea and its tributaries?
- Can episodes of channel activity and abandonment and wetland expansion across previously dry land surfaces on the zone be dated?
- Does evidence of prehistoric and historic occupation survive on the low terrace (Landscape Zone 1)?
- How extensive is modern truncation across the zone? Do made ground deposits bury or truncate the post-medieval / modern land surface?
- What was the pre-modern / pre-Victorian topography of the zone?
- Is there any evidence of a Roman road and/or occupation activity within the area of the zone? If so, how does it relate to what is known of the settlement pattern further north in the Leyton area during the Roman period?
- Can surviving remains of the medieval and post-medieval mills at Temple Mills provide information on the nature of industrial activity in the Lea valley?



- Is there any evidence of medieval and post-medieval agricultural activity present on the zone? Is this associated with Chobham manor or Ruckholt manor and their later landholdings?
- Is there evidence for past water management, i.e. drainage ditches, mill remains, sluices and revetments associated with earlier courses of the Channelsea River/Henniker's Ditch and River Lea?

## 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 PDZ6 (MoLAS-PCA 2007b).

### 2.1 Modern topography and drainage

The site is located towards the eastern edge of the valley of the River Lea, c 3km to the north of its confluence with the River Thames. The Channelsea River/Henniker's Ditch passes through the western part of the site. The extent to which these rivers are man made or were originally natural is not yet known. The straight course of Henniker's Ditch suggests that, if formerly a natural watercourse, it has been severely altered. The Channelsea River is reputed to have been constructed by King Alfred. Owing to extensive ground raising in the area of the Eastway Cycle Circuit, both rivers currently lie at the base of deep, artificial canyons, and their flow is controlled by sluices.

Modern ground level varies greatly across the vicinity of the site, as a result of modern ground raising. In the area to the west where the Eastway Cycle Circuit and the former allotments lay it rises to over 16m OD, whereas adjacent to the rivers and where little ground raising has taken place, the modern land surface lies at around 5m OD.

### 2.2 Natural topography and past landscape setting

The majority of the site lies on alluvium, which represents a range of different wetland and dryland environments existing on the valley floor (floodplain) of the Lea from the Mesolithic period onwards. Archaeological remains of the prehistoric and earlier historic periods are likely to lie within the alluvium. The eastern part of the site follows to the edge of the **Taplow** and **Kempton Park Gravel** terraces, which denote the eastern valley side.

The alluvium is underlain by the **Lea Valley Gravels**, deposited following the scouring-out of the valley floor during the Palaeolithic period (the Pleistocene). The gravels are the most recent in a series of Pleistocene river terrace deposits, which today form an irregular flight of steps in the valley side. The **Kempton Park** Gravels and older **Taplow** Gravels form the lowest of these river terraces, at the edge of the valley. Tertiary bedrock, which in this area is variably London Clay and Woolwich and Reading Beds, underlies the gravels. The bedrock pre-dates the period of human evolution and thus its surface acts as the bottom line for deposits of archaeological interest.

The landscape of the site today bears little resemblance to its topography and environment in prehistoric and historic times. The characteristics of this ancient landscape will have influenced its use by people in the past and, subsequently, the preservation of archaeological remains. By reconstructing the past landscape that lies buried below made ground and alluvium, inferences can be made about the likelihood

of finding archaeology within the site and the types of archaeological evidence that may exist. A summary of the buried landscape characteristics of the site and the archaeological implications are given here:

- The upper stratigraphy of the site is characterised by a thin layer of alluvium beneath modern made ground. This part of the valley floor was not scoured away by **Late Glacial** meltwaters and consequently the gravels have the potential to contain palaeoenvironmental deposits of considerable significance, possibly comparable with the *Lea Valley Arctic Beds*. It is possible that minor watercourses once crossed this area, although their location is not known.
- Evidence for extremely rare *in situ* Late Upper Palaeolithic activity, not previously found in the Lower Lea but similar to that known from the Colne Valley, might exist in the fine-grained deposits that overlie the gravel.

As the site would have provided dry and fertile land in the prehistoric and later periods, it has potential for settlement and other activity but probably low palaeoenvironmental potential.

### 2.3 Prehistoric

In 1913, a prehistoric worked bone fragment was found c 200m north-west, within low-level gravel at 15ft (4.65m) OD, possibly during quarrying. The exact location of the find is uncertain, and both Palaeolithic and Neolithic material is listed in the GLSMR description. Two Palaeolithic hand axes were found in low-lying gravel at a depth of approximately 20ft (6.1m) OD c 30m to the north of the site.

In the late Mesolithic (6,500–4000 BC) and early Neolithic (4,000–3300 BC), rising water levels is thought to have resulted in the abandonment of the low-lying areas of the river valleys and a shift further upstream or onto the valley sides (Lewis *et al.*, 1992, 244). The late Neolithic, Bronze Age (2000–600 BC) and Iron Age (600 BC–AD 43) periods were characterised by forest clearance, permanent settlement and farming, with increasing population throughout each period. The gravel terraces beside the River Lea and the Low Terrace within the modern floodplain, would have been attractive for early settlers, the gravels producing light, fertile and well-drained soils, with close access to the rivers for food resources and transport.

During the Bronze Age and Iron Age the Lea Valley was well populated and the wetland areas were utilised as well as the river terraces. The Upper Lea Valley has evidence for Bronze Age/Iron Age settlement in the form of crannogs; dwellings set on piles driven into marginal river environments and wetlands. Although no such finds are as yet known from the vicinity of the site, the possibility of similar structures having been present cannot be discounted, as areas of higher ground within the Lower Lea Valley would have presented an environment favourable to settlement.

### 2.4 Roman

The Lea is likely to have been an important route in the Roman period. It was probably used to supply the London area both with agricultural produce and, in the late period, with pottery from Much Hadham, via the River Stort. Archaeological investigations have established that Roman settlement existed on both sides of the Lea Valley, at Old Ford and in the areas of Stratford and Leyton.

Newspaper reports of 1783 refer to the discovery of a stone sarcophagus containing a sword, a helmet crest fragment, a spur, a padlock, and three coins found at a depth of four to five feet below the surface of the marsh in 1783. The GLSMR entry states that a description of the stone coffin, which was left *in situ*, suggests however that it may have been of medieval date. A burial vault containing several urns was also found during the removal of old foundations at Temple Mills, one of which contained Roman coins dating from Caesar to Constantine the Great together with several medals. The vault was reportedly on the edge of the River Lea on the site occupied by the East London Waterworks Company. All of the above discoveries are attributed to the same find spot, but there is some uncertainty as to the precise location, which is shown in two places on the GLSMR, one of which lies *c* 300m to the north of the site.

As with the prehistoric period, in the vicinity of the site, islands of higher ground would have provided dry and fertile land suitable for settlement throughout this period, whilst areas of marsh would probably have been exploited for varied and predictable resources.

## 2.5 Saxon

The site lay within the ancient parish of West Ham, which probably formed out of the manors (estates) of Ham (meaning ‘low-lying pasture’) and possibly part of Leyton (‘settlement on the Lea’) mentioned in Domesday Book (AD1086).

Evidence of Saxon activity in the area is limited to the River Lea and its channels (the Stratford Back Rivers). The river will have remained a useful resource and by the late Saxon period mills may have been located along the river. Domesday Book mentions a number of mills along the Lea and its tributaries although the location of these mills is uncertain. It is possible that the medieval Temple Mills was built on the site of a Domesday mill.

Saxon activity has been recorded *c* 300m to the south-east of the site during archaeological investigations at Stratford Box for works for Stratford International Station although no early medieval material has been located within the area of the site itself. Throughout this period much of the site was located within marshland and was probably used for pasture and/or meadow.

## 2.6 Medieval

As with earlier periods, the higher ground of the gravel terrace to the east of the site would have been the first choice for settlement, providing dry and fertile land with good access to the rivers and marsh. The low terrace identified in the vicinity of the site and islands in the marsh may also have been suitable for secondary settlement. Within the vicinity of the site, documentary sources indicate the presence of a mill to the north-west and two manor houses, to the south-east and north which would have probably have involved some attempt to drain the marsh. It is likely that most of the marshland within the Lea Valley was reclaimed in the later medieval period (possibly earlier). This was carried out primarily for economic reasons, in providing improved pasture for livestock and fertile land for crops. Trackways or drove ways (‘manor ways’), often following the line of river embankments, would have provided access across the marsh from the settlements on the higher ground..

Between 1185 and 1278, the Knights Templar, using land granted to them by William of Hastings, steward to Henry II, built a water mill at Temple Mills. The mill is believed to be located to the north-west of the site, north of the extant Channelsea watercourse. There has been substantial land raising on the site of the mill, although it is possible that its remains are preserved beneath the made ground. A bridge was also constructed near Temple Mills in the 14th century by the Knights, possibly a precursor to that shown on Rocque's map of 1746. The line of Eastway is also marked on Rocque's map and may have its origins in the medieval period.

Approximately 650m to the east of the site was the location of the medieval manor house of Chobham's, later owned by Lord Henniker, which survived at least into the 1860s. The manor of Chobham's was formed in 1329–31 by John de Preston. This passed eventually to Thomas de Chobham in 1343. Chobham only owned the manor until 1356 when it was bought by Adam Fraunceys, a merchant who also bought Ruckholt to the north. However it is Chobham's name which stuck to the manor.

## **2.7 Post-medieval**

According to the GLSMR, there is documentary evidence for a number of mills in the vicinity of the medieval Temple Mill. These comprise a leather mill, which may have medieval origins, and subsequent logwood, gunpowder and a cutter's mills. Another mill is recorded here in the 1630s, used for working brass, tin and lead sheets, which may also have been an experimental foundry used by Prince Rupert for the production of toughened bronze. Prior to the detailed mapping of the area available in the 19th century, the area of PDZ6 was most probably agricultural in nature and features associated with agricultural boundaries, possible diversions of the Channelsea Rivers/Henniker's Ditch and late 19th century land use could exist within the site. Later post-medieval development consists of 19th century industrial development located in the east of the site and is shown on historic mapping from the late 19th century. A manure works was established to the north and east of the site and brick field at the south.

## 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).

Two evaluation trenches were excavated to assess the archaeological potential of PDZ6, Work Package 6: PDZ6.28, and PDZ6.35 (Fig 2). PDZ6.28 was on the east side of the Channelsea, while PDZ6.35 was on the west.

Both trenches were excavated to the base of the archaeological sequence. A mechanical excavator using a flat-bladed ditching bucket undertook the bulk excavation, monitored by an archaeologist and a banksman at all times. In cases where archaeological features were encountered within the sequence, machining of trenches was done in stages. MoLAS-PCA geoarchaeologists visited the trench during excavation to examine and interpret the deposits in plan and section and to take samples as appropriate.

Work on Trench PDZ6.28 began in the week ending 18 March 2008 and was completed 26 March. Trench PDZ6.35 began 12 February 2008 and was completed 25 February.

The locations of the evaluation trenches were recorded by the MoLAS-PCA surveyor using an EDM. This information was electronically collated and plotted onto the OS grid. Levels were calculated from benchmarks established by Morrison's engineers, imported onto the site.

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 site has produced: 2 trench plans at a scale of 1:20, 30 context records, and 3 sections at a scale of 1:10. In addition, 8 bulk samples, 2 monolith sampled sequences (9 monolith tins) and 3 organic grab samples for radiocarbon dating were collected. All of the bulk samples have been partly processed, in order to evaluate their potential. The samples will be retained in the on-site storage facility until a decision has been taken on their requirement for environmental assessment and analysis.

The site records will be deposited under the site code OL-08908 in the LAARC, of the Museum of London.



### 3.2 Results of the evaluation

See Fig 2 for trench locations.

#### 3.2.1 Trench PDZ6.28

Location	Eastern bank of the Channelsea River, immediately to the north of the Bully Point Pond Nature Reserve
Dimensions	10.8m x 4.8m at base; 4.26m depth from river bank to the west, 10.29m depth from top of made ground to the south and east
Modern ground level	5.75m OD to 11.78m OD
Base of modern fill	2.47m OD
Depth of archaeological deposits seen (alluvium)	1.8m
Level of base of deposits observed and/or base of trench	1.49m OD
Natural floodplain gravels observed	1.74m OD

Table 1 Trench PDZ6.28 deposit summary

See Fig 3 and Fig 4.

##### 3.2.1.1 Phase 1: Late Glacial/ early Holocene deposits

The surface of natural loose, light grey-brown sandy-gravels [25] was seen in plan and section at 1.74m OD across the whole trench, and extended beyond the limits of excavation.

##### 3.2.1.2 Phase 2: ?Roman activity

The gravels were overlain by a layer of finer grained, loose, mid yellow-grey-brown sandy-gravels [24], with a moderate organic component, to a height of 2.03m OD.

This deposit contained sherds of re-deposited Hadham Ware dated to AD 200–400 (see Appendix 2). The sherds were unabraded and were probably not trans-shipped, and therefore likely to have been deposited in the Roman period. With no other evidence for Roman cultural activity in the trench it is not possible to suggest whether these sherds had any association. However, they do demonstrate a potential for Roman activity in the vicinity.

##### 3.2.1.3 Phase 3: Alluvial deposit (?surface)

A layer of mid brownish-red clayey-silt that was mixed with the underlying gravels [26] overlay sandy deposit [24] in the southern end of the trench. This was encountered at 1.76m OD.

The character of this deposit is presently unique within the ongoing archaeological and geoarchaeological investigations across the whole of the OLY park, although it is

conjectured that this clayey-silt may have been laid to consolidate gravel layer [24], stabilising them to form a surface.

Whilst no dating evidence was recovered from this layer, its stratigraphic and physical relationship to [24] which contained mid-late Roman pottery, suggests a relative date (late Roman).

#### *3.2.1.4 Phase 4: : Redeposited alluvium*

Soft, mid greyish-brown alluvial silty-clay [23] overlay the surface of gravel layer [24]. This contained organic material that was more notable in the upper part of the deposit, and was encountered at 2.66m OD, measuring 0.75m thick. This was overlain by another, 0.33m thick, alluvial deposit of soft, light blue-grey clay [19] present at 2.69m OD.

A 0.50m thick alluvial layer of soft, light yellow-grey clay [17] sealed the earlier alluvial deposits with a surface level of 3.29m OD.

#### *3.2.1.5 Phase 5: Cut features (agricultural activity with topsoil)*

A north-east-south-west aligned linear feature [28] cut into alluvium [17] from 2.60m OD. The cut measured 0.62m deep and had vertical sides breaking to a flat base. Redeposited soft, mid blue-grey clay [27] filled the cut.

A series of north-east-south-west furrow type features were also observed across the trench. Cuts [21] and [22] truncated into the surface of alluvial layer [19]. Both features had steep sides; irregular to flat bases, and depths of 0.33m and 0.35m from heights of 2.76m OD and 2.82m OD respectively. Both cuts formed a singular feature in plan, the individual cuts only visible in section. They were filled by deposits [20] and [18] respectively, composed of re-deposited soft mid blue-grey clay, containing pottery, glass, metal, and CBM dating from the 19th century onwards.

Furrow [29] cut across above fill [27], while furrow [30] truncated alluvium [17], both from 3.33m OD. Both furrows had gently sloping sides, a near flat base, with depths of 0.64m and 0.76m respectively.

#### *3.2.1.6 Phase 6: 19th-20th century made ground*

A layer loose, dark brownish-black sandy-silt [16] overlay furrows [18] and [20], and formed the fill of furrows [29] and [30]. This contained a significant amount of pottery, glass, metal, CBM, and wood, and represents dump material used from the 19th century onwards to raise the ground level to its present height.

### 3.2.2 Trench PDZ6.35

Location	Western bank of the Channelsea River, to the southwest of the former Eastway Cycle Circuit
Dimensions	10.55m x 3.2m at base; 4.0m deep
Modern ground level	5.34m OD to 5.42m OD
Base of modern fill	3.15m OD
Depth of archaeological deposits seen (including alluvium)	2.38m
Level of base of deposits observed and/or base of trench	1.43m OD
Natural floodplain gravels observed	1.8m OD

Table 2 Trench PDZ6.35 deposit summary

See Fig 5 and Fig 6.

#### 3.2.2.1 Phase 1: Late Glacial/ early Holocene deposits

Loose, light yellowish-greyish-brown sandy-gravels [15] formed the base of the observed sequence. The gravels were present in section at 1.64m OD, and extended across the trench.

A layer of loose, light greyish-brown sand with gravels [14] measuring 0.24m thick, sealed gravel layer [15] from 1.80m OD.

#### 3.2.2.2 Phase 4: Redeposited alluvium

A 0.35m thick layer of soft, dark greyish-brown alluvial clay [12] overlay [14] from 2.01m OD in the northern part of the trench. In the southern end of the trench gravel [14] was overlain by mixed lenses of mid greyish-brown fluvial clay including tufa, sand and silt [13], encountered at 2.06m OD, with a thickness of 0.27m.

Both layers [12] and [13] were overlain in turn by two layers of fluvial deposits: Loose light greyish-brown clayey-sand [11] that was encountered at 2.06m OD, and was 0.28m thick overlain by loose light greyish-brown sand [10] with some organic material. The latter was 0.26m thick and survived to 2.18m OD in section. A 0.53m thick layer of soft, light greyish-brown silty-clay [9] with occasional organic components overlay [10] at 2.63m OD.

Above this were two further layers of soft alluvial clay [8] and [7]. Layer [8] was dark bluish-greyish-brown, 0.20m thick, and was found at 2.78m OD. Layer [7] was light yellowish-grey, 0.30m thick, and present at 3.11m OD.

#### 3.2.2.3 Phase 5: Cut features (agricultural activity with topsoil)

A feature with near vertical sides, an irregular base, and depth of 0.41m [6] cut through alluvium [7] in section at 2.96m OD. This was filled with a soft mid yellowish-greyish-brown re-deposited clay [5]. Overlying this was 0.35m thick layer of soft, mid yellowish-brown clay [4], possibly re-deposited at 3.65m OD.

Soft, dark brownish-black clayey-silt [3] sealed the fill [4] in section and plan cross the trench extent to a depth of 0.51m. This was seen in plan and section at 3.81m OD, and is probably a topsoil layer latterly buried and preserved by later dumping deposits.

#### *3.2.2.4 Phase 6: 19th–20th century made ground*

The latest deposits in the trench comprised dumped material dating from the 19th century onwards. The earlier was a loose, dark reddish-brown sandy-silt [2] at 5.42m OD measuring 1.47m thick.

This was capped by loose mid yellowish-greyish-brown silty-sand [1] to a surface of 5.42m OD.

Both layers contained pottery, glass and metal, while [2] also contained wooden objects dating from the 19th century onwards (see Appendix 2).

### 3.3 Stratigraphic interpretation of the site

In general, the sands and gravels present at the base of both trenches were deposited in the Late Glacial period (and reworked to some degree in the early Holocene). These deposits were overlain initially by flood deposits of sandy silty clays with some organic and tufaceous material (in the case of PDZ6.35 on the west side of the Channelsea) which in time became humic clays having accumulated in shallow standing or stagnant water environments. Blue-grey clays (becoming slightly oxidised with height) over these deposits are likely to indicate meadowland subject to seasonal overbank flooding. A landsurface existing prior to the industrial development, indicated by traces of (ridge and) furrow, survived in PDZ6.28 and a relict topsoil or trampled surface in PDZ6.35. The alluvial stratigraphy was sealed by approximately 2m of made ground in both trenches.

PDZ6.28 was on the east side of the Channelsea, while PDZ6.35 was on the west.

#### 3.3.1 *Phase 1: Late Glacial/ early Holocene deposits forming the buried topography*

The surface of natural gravel lay at 1.74m OD on the east bank and 1.43m OD on the west bank of the Channelsea in PDZ6.35 on the west. This falls within the range approximately predicted in geoarchaeological transects (MoLAS-PCA, 2007a) as being a probable Late Glacial/ early Holocene deposit which formed the Mesolithic land surface at the edge of the main channel area. This also reflects the landscape modelling undertaken prior to work (MoLAS-PCA, 2007a), which showed the edge of the site around the border of the buried topography in the range of 1 to 3m OD.

#### 3.3.2 *Phase 2: ?Roman activity*

The potential Roman survival in PDZ6.28 on the east side of the Channelsea (represents the only archaeological evidence pre-dating the post-medieval period within the site).

A possible surface composed of sandy-silt that consolidated the sandy-gravels was present immediately above the dated gravel layer, however this contained no independent dating evidence.

#### 3.3.3 *Phase 3: Alluvial deposits (?surface)*

Over the gravels a succession of alluvial layers were deposited. The alluvium in PDZ6.28 was approximately 1.7m in depth and in PDZ6.35 it was approximately 2.22m in depth.

These deposits represent a gradual transition from clean freshwater flood deposits to humic silts representing slackwater areas at the fringes of the main river channel to humic clays likely to represent shallow standing water in backwater areas, cut off from the river. These sediments probably reflect a period of rising river levels in response to relative sea level rise that caused estuarine environments to encroach upstream.

No dating has yet been obtained from these deposits but their timing and characteristics could be compared to current understanding of relative sea level fluctuations recorded in the alluvial sequences of the Thames.

The upper 1m to 1.5m of alluvial deposits across both trenches are predominantly greyish fairly stiff cohesive clays. These deposits accumulated by clay settling out of standing water during periods of seasonal overbank flooding. During summer months the floodwater drained away, the landsurface dried out and soil processes took place, working the clay into the soil, which built up as an ‘accretionary’ soil profile.

### ***3.3.4 Phase 4: Redeposited alluvium***

Redeposited alluvium was observed in both trenches. The exact purpose of this uncertain, though it might be ground consolidation. No dating evidence was associated with these deposits.

### ***3.3.5 Phase 5: Preserved topsoil and potential agricultural activity***

Furrows and plough soil were recorded in both trenches. The backfill of the furrows included 19th century finds. These probably relate to a phase of agricultural activity associated with the nearby Chobham’s Manor.

### ***3.3.6 19th–20th century made ground***

Both trenches were sealed by a sequence of Victorian to modern made ground deposits indicating historic landfill. These deposits were used to build up the landscape to its present form.

## **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 exposed within the evaluation trenches. 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 Olympics site and to target samples and locations for analysis.

### ***3.4.2 Sediment characteristics***

Monolith tin samples were taken through the natural deposit sequence, as exposed in trenches PDZ6.28 and PDZ6.35. The tins provide an undisturbed column of sediment for off-site examination. The location selected for sampling was considered to be a representative profile of the deposits exposed in the trench. The monolith sequence is 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 deposits. 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*

Microfossil examination might be able to provide information about the floodplain characteristics and surrounding vegetation. The monoliths will be retained until environmental assessment is undertaken, when sub-samples for microfossils such as pollen and diatoms will be examined to determine their potential for past environment reconstruction (see below).

### 3.4.4 *Bulk sample processing*

Eight environmental bulk soil samples (170L) from seven contexts were selected and partly processed for the evaluation for the potential recovery of plant and invertebrate remains, to provide information on the local environment and any human activity at the time of deposition. Any such information would complement that obtained from monolith samples through sedimentary sequences. The aim of the evaluation was to establish the presence or absence of biological remains, and whether a full assessment of any of the materials present in the samples should be carried out.

The samples were ten to twenty litres in size with five litre sub-samples from each deposit being processed for the evaluation. The five litres from each sample was floated onto a 0.25mm sieve with the residue from this fraction wet-sieved through a 0.5mm mesh. Five litres of soil at least from each sample was retained. 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.

The results are collated in Table 3.

Context	Sample	soil processed (l)	soil retained (l)	Seeds/fruits	insects	molluscs
12	2	5	15	+++		
12	3	5	5	+++	+	+
09	4	5	15	++(+)		++
10	5	5	5	+++	+	+
19	12	5	15	+	+	+
23	13	5	15	++(+)		+++
24	14	5	15	+	+	+
25	15	5	15			

*Table 3 Evaluation of environmental evidence*

A visual examination of the flots was carried out to establish the potential for the survival of different forms of biological evidence. All the samples produced flots. The wet flots were divided into fractions by washing through a stack of sieves and

scanned using a binocular microscope. This information has been used to determine the most appropriate strategy for assessment (see below).

#### **3.4.5 Radiocarbon dating**

Although some idea of the date of the deposits excavated has been inferred from the Roman pottery at the base of the sequence in PDZ6.28, no reliable date has yet been obtained for the whole deposit sequence in either trench. Environmental evidence, unlike artefacts, is not intrinsically dateable and the information about the past landscape preserved in the sequence means little unless it is tied in to an archaeological timeframe.

However, some deposits excavated contained twigs and other plant remains, from which radiocarbon dates might be obtained. Although some samples specifically for radiocarbon dating were taken, the sequence of bulk samples (and the monoliths if necessary) should provide sufficient extra material for the extraction of single entity organic remains suitable for radiocarbon dating by AMS (Accelerator Mass Spectrometry) if needed.

#### **3.4.6 Molluscs and ostracods**

Occasional shells of fresh water (?) molluscs were noted in samples {2}, {4}, {5} and {14} and a moderate number in sample {3}. A relatively large assemblage was seen in sample {12}. Very occasional ostracod valves were noted in samples {2}, {3} and {13}.

#### **3.4.7 Plant remains**

Seven of the eight samples produced organic plant remains, including small fragments of woody material, rootlets (particularly prevalent in samples {4}, {14} and {15}) and occasional moss, as well as a single alder (*Alnus glutinosa*) catkin in sample {5}.

Identifiable fruits and seeds were present in each of these seven samples, with reasonably high seed numbers and species diversity in all four samples ({2}, {3}, {4} and {5}) from PDZ6.35 on the western bank of the river, and in just one, {13}, from trench PDZ6.28 on the eastern side. Very few seeds were seen in samples {12} and {14}, and none in sample {15}.

The majority of fruits and seeds in all samples were from plants of aquatic and wetland habitats, including pondweed (*Potamogeton* sp.), horned pondweed (*Zannichellia palustris*), water plantain (*Alisma* sp.), sedges (*Carex* spp.) and club-rush (*Schoenoplectus* sp.), but all samples included occasional seeds from dryer habitats such as docks (*Rumex* spp.), buttercups (*Ranunculus acris/bulbosus/repens*) and stinging nettle (*Urtica dioica*).

Occasional small fragments of wood charcoal were present in three flots, from samples {3}, {4} and {12}.

#### **3.4.8 Insect remains**

Four samples produced occasional fragments of beetle (Coleoptera) exoskeleton, and

Assessment of the evaluation

### **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 this case, the evaluation trenches exposed natural gravels, then natural sandy-gravels on the east bank possibly dating to the Roman period, with part of a consolidation surface overlying these layers. The gravels in both trenches were overlain by fluvial and alluvial sequences, then redeposited clays, followed by relict topsoil on the west bank and furrow cuts on the east bank, finally sealed by 19th–20th century made ground or dump deposits. The gravel represents a horizon beneath which no deposits of archaeological significance are likely to be found.

The sandy-gravel layers represent a horizon beneath which no deposits of archaeological significance are likely to be found. 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.

The trenches were undertaken so as to gain an understanding of the archaeological potential of the area, and positioned where possible to gain even coverage and represent an assessment of no less than 5% of these areas. The trenches thus satisfy the original requirements of the evaluation as stated in the Written Scheme of Investigation (MoLAS-PCA 2007b).

## 4 Archaeological potential

### 4.1 Realisation of original research aims

The extent to which the evaluation has been able to address the individual research objectives established in the Method Statement for PDZ6 is discussed below:

*Do Kempton Park Gravels exist in the extreme eastern part of the zone? What is the potential for past environment reconstruction from these deposits?*

PDZ6 Work Package 6 did not fall within this area and thus the evaluation is unable to answer the proposed research question.

*Do deposits pre-dating the Last Glacial Maximum, which might correspond with the Arctic Beds, exist within or below non-reworked gravels in the eastern parts of the zone (Landscape Zone 1)? What is the potential for past environment reconstruction and/or Late Upper Palaeolithic activity in these deposits?*

No such deposits were observed within any of the trenches, as the Pleistocene gravels and sands were not excavated. As such, the potential for past environmental reconstruction remains unknown.

*What is the potential for dating (e.g. OSL or radiocarbon dating) the sandy clay/clayey sand deposit that lies above the gravels of the Low Terrace in the eastern part of the zone (Landscape Zone 1)? Can the depositional environment of these deposits be interpreted?*

PDZ6 Work Package 6 did not fall within this area and thus the evaluation is unable to answer the proposed research question.

*Do Late Glacial deposits exist within re-worked gravels in the southwest part of the zone (Landscape Zone 3)? What is the potential for past environment reconstruction and/or Late Upper Palaeolithic activity in these deposits?*

Trench PDZ6.35 fell within Landscape Zone 3 and Trench PDZ6.28 fell at the edge of Landscape Zones 2 and 3. Possible Late Glacial/Early Holocene deposits were observed during evaluation, but issues of water ingress through the base of the trench would not have facilitated deeper excavation into the basal gravels. Therefore, based on this evaluation, the potential for past environmental reconstruction and/or Late Upper Palaeolithic activity in these deposits remains unknown.

*Do slope deposits of Pleistocene and/or Holocene origin overlie Pleistocene gravel in the eastern part of the zone? What direct or indirect evidence of past human activity is associated with the colluvium?*

The eastern part of PDZ6 was not covered by this evaluation, thus the presence of slope deposits is unknown. The deposits observed during the evaluation appear to be of alluvial and fluvial nature, not colluvial.

Whilst there was no evidence of past human activity within the observed alluvial or fluvial deposits, pottery dated to AD 200–400 was recovered in the underlying sandy-

gravels of PDZ6.28. Both trenches contained late post-medieval features that truncated the surface of the alluvium.

*Did the Leyton River cross the zone in the Pleistocene or Holocene and is there evidence for human activity associated with the river?*

There was no evidence of the Leyton River crossing the area evaluated as PDZ6, Work Package 6. However, the alluvium may have been deposited by flood events associated with a waterway in the area, likely an earlier channel or branches of the Channelsea or Lea Rivers. Beyond the potential Roman activity, there was no evidence of human activity associated with any putative river

*Can channels of the River Lea be distinguished from its tributaries in the south-western part of the zone? Does evidence for human activity, similar to that found in the Stratford Box, associated with the river, survive?*

No apparent channels were evident, and it is thought that the site lies outside of the predicted main channels area.

However, there were possible channel deposits within the fluvial/alluvial sequence. No evidence of human activity associated with the Lea was observed

*What environmental evidence suitable for past landscape reconstruction exists within deposits associated with ancient channels of the River Lea and its tributaries?*

No waterway channels were observed during the evaluation. A series of bulk samples were taken from the observed alluvial deposits, most of which had good organic remains preserved.

The geoarchaeological evidence gained from these samples and further geoarchaeological work – particularly on the monolith and C14 samples – along with the recorded observations regarding deposit types, composition, and depths will all aid in past landscape reconstruction.

*Can episodes of channel activity and abandonment and wetland expansion across previously dry land surfaces on the zone be dated?*

No channels were present within either evaluation trench although wetland expansion can be dated by taking radiocarbon dates from the alluvium sampled in the monolith tins.

The presence of pottery sherds dating to AD 200–400 within gravels directly underlying the fluvial/alluvial sequence in Trench PDZ6.28 can be used to give an approximate date after which such deposits were laid down (TPQ). The surface or consolidation layer observed as associated with the gravels suggests that for some period of time this represented a dry land surface, which was subjected to the effects of wetland/waterway expansion or migration at some point in the Late Roman–post Roman period.

*Does evidence of prehistoric and historic occupation survive on the low terrace (Landscape Zone 1)?*

The evaluation did not take place within the area of Landscape Zone 1 (as identified in the Desk based assessment MoLAS-PCA 2007a).

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

There was no observable evidence of a Roman Road or occupational activity within the site.

However, there was potential for late Roman activity in the vicinity indicated by the pottery recovered from near the base of the archaeological sequence in Trench PDZ6.28.

It is possible that the clay layer overlying and consolidating part of the gravels that contained the pottery also dates to this period.

It is not possible to conclusively state how it relates to the settlement pattern seen further north in the Leyton area.

*Can surviving remains of the medieval and post-medieval mills at Temple Mills provide information on the nature of industrial activity in the Lea valley?*

The evaluation falls outside the area of Temple Mills, thus the research aim cannot be answered. There was also no evidence that may be associated with the mills.

*Is there any evidence of medieval and post-medieval agricultural activity present on the zone? Is this associated with Chobham manor or Ruckholt manor and their later landholdings?*

Several furrows cut through the surface of the alluvial sequence on the east bank of the Channelsea River in PDZ6.28.

Map regression (MoLAS-PCA 2007a) shows that the location of trench PDZ6.28 either fell within or just on the western boundary of the estate of Chobham's Manor. It is possible that the furrows may have been associated with Chobham's Manor, and the cuts containing the redeposited clays may also result from this phase of activity.

*What was the pre-modern/pre-Victorian topography of the zone?*

The pre-Victorian topography within the site was notably lower than that of the present day. It was relatively flat, with the surface of alluvial clays observed at 3.11m OD to 3.29m OD, slightly higher than that predicted by the earlier landscape modelling.

*How extensive is modern truncation across the zone? Do made ground deposits bury or truncate the post-medieval/modern land surface?*

The impact from modern truncation within the site was minor. There was evidence of limited truncation in the form of shallow cuts containing redeposited alluvium and furrows from the surface of the alluvial sequence in both trenches. The made ground deposits buried the post medieval land surface in both trenches. In general the underlying depositional sequence appeared to be largely intact.

*Is there evidence for past water management, i.e. drainage ditches, mill remains, sluices and revetments associated with earlier courses of the Channelsea River/Henniker's Ditch and River Lea?*

There was no evidence for past water management.

## **4.2 General discussion of potential**

The evaluation has shown that earlier deposits survive intact beneath 19th century made ground. These comprise areas of re-deposited clays, a possible Roman phase



and relict topsoil, above a maximum depth of 2.3m of alluvial and fluvial sands and clays, which overlie floodplain gravels. Some of the re-deposited clays can be dated to the 19th century onwards, whilst the loose sandy-gravel overlying the base of the sequence in PDZ6.28 can be dated to the Later Roman period.

It was suggested in the DBA (MoLAS-PCA, 2007a) that the area in which the site was situated is likely to occupy, or lie adjacent to, the main channel area of the Lea, and have been exploited by former courses of the river and a range of past wetland environments.

As it stands, the extent to which the present form of the Channelsea River is man made or originally natural is uncertain, though it is reputed to have been constructed by King Alfred. It had been suggested that across the entirety of PDZ6 there is a low potential for Roman and Saxon remains, a low to moderate potential for prehistoric remains, a high potential for medieval and post-medieval to modern remains. Based on what was observed, it can be said that the potential for the evaluated area is low for pre-historic, Saxon, and medieval remains, moderate for Roman remains, and a high potential for post-medieval remains

The alluvial deposits have a rich assemblage of environmental remains and have high geoarchaeological potential for past landscape reconstruction. There is good potential for past environment reconstruction from seeds, snails, insects and ostracods – all of which the evaluation has shown to be preserved in the bulk samples. Microfossils, and in particular pollen and diatoms, are likely to be preserved in the monolith samples taken through the wetland deposits. No radiocarbon dates have yet been obtained from the OL-08908 trenches, although there is good potential for radiocarbon dating samples from organic material. This would help to clarify the timing of river activity and wetland development across the site as a whole.

A key question to be addressed regarding the alluvial sequence is when and in what way did estuarine incursion reach this part of the Lower Lea Valley. The encroachment of estuarine environments and tidal water up the Lea Valley would have had a significant impact on the activities of people living in and exploiting the locality. There is good potential for the samples obtained from the evaluation to provide dates and useful information (such as from ostracods, diatoms and forams) from which we can infer the timing and nature of the transition from a freshwater to tidal river.

In addition to dating the deposit sequence and examining the biological remains preserved within the samples, there is very good potential for more detailed examination of the trench records to contribute to our understanding of the past topography and evolving environment, by inputting the stratigraphic information into the Olympics geoarchaeological database and modelling the semi interpreted data in ARC GIS.

Analysis of samples taken from the furrow system observed will yield information relating to the past agricultural usage of the land, which will also be of local significance in the understanding of the activities of the local manorial landholdings.

### **4.3 Significance**

The evaluation of PDZ6, work package 6 has added limited information to the archaeological understanding of the area, beyond the potential Roman activity in the vicinity. As such the evaluation has revealed activity on the site during a drier period prior to the alluvial build up. This was followed by a period in which no evidence of human activity was evident and the area was influenced by water movement and periods of flooding until a phase of clay re-deposition, agricultural activity in the late post-medieval period, followed by ground raising indicated by Victorian and later dumping. Such information is of local significance.

The geoarchaeological evidence seen across both sites has been able to provide information that will aid in the overall understanding of the evolving environment of the Lea Valley.

The information will assist in landscape reconstruction models being developed for the Lower Lea Valley and in considerations of the relationship between the changing environment and human activity. It is certainly of local significance and collectively when integrated with similar information from other sites on the Olympics as a whole, would be regionally significant, however, there is nothing to suggest that they are of national importance.

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

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 of the site is not characteristic of any particular period. 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*

Whilst there may be considerable contemporary documentation for the later medieval period from c 1300 onwards, it is unlikely that any of this will be specific enough to relate to individual features.

### *Criterion 4: group value*

The landscape features relate to and are part of the wider pattern seen within the Olympic Park and elsewhere in the Lea Valley. Full interpretation is only possible in that context.

### *Criterion 5: survival/condition*

The evaluation results have demonstrated that geoarchaeological and archaeological remains were preserved beneath 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 deposits at the site do not represent a diverse and heterogeneous group of archaeological remains of all types and periods. However,

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

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)*

Evidence for pre-Victorian, pre-agricultural activity was limited. This was sealed by a compacted layer of redeposited clay potentially in use as a consolidated dry land surface. Deep deposits of post-Roman to early post-medieval alluvium were preserved intact below 19th to 20th century made ground. Post medieval topsoil and furrows were also present above the alluvium, indicating agricultural exploitation of the wider landscape consequent to drier valley conditions. The presence and survival of post-medieval agricultural evidence, notably the furrows in PDZ6.28, suggests that the potential for remains from this period is high.

There is good potential for past environment reconstruction from seeds, snails, insects and ostracods, all of which the evaluation has shown to be preserved in the bulk samples. Microfossils, and in particular pollen and diatoms, are likely to be preserved in the monolith samples taken through the alluvial deposits. No radiocarbon dates have yet been obtained from the OL-08908 trenches, although there is good potential for radiocarbon dating samples from organic material. This would help to clarify the timing of river activity and wetland development across the site as a whole.

In addition to dating the deposit sequence and examining the biological remains preserved within the samples, there is very good potential for more detailed examination of the trench records to contribute to our understanding of the past topography and evolving environment, by inputting the stratigraphic information into the Olympics geoarchaeological database and modelling the semi interpreted data in ARC GIS.

Furthermore, analysis of the geoarchaeological samples taken from the trench deposit sequences associated with the agricultural evidence has potential to contribute and further present understanding of the Lea Valley landscape, settlement and exploitation from early prehistory to present day.

## 6 Proposed development impact and recommendations

Proposed developments for Work Package 6 of PDZ6 involve construction of footbridge FO5 (Henniker's Ditch Fencing Bridge), including substructure, wing walls and deck. The construction methods for these works as currently advised and assessed will likely destroy all of the archaeological deposits within its footprint. As such these have been assessed as impacting fully upon the archaeological resource (MoLAS-PCA, 2007b).

The assessment above (Section 5) does not suggest that preservation *in situ* would be an appropriate mitigation strategy. The evaluation has shown that deposits survive beneath 19th century and later made ground, alluvial (possible floodplain) deposition and worked agricultural soils. MoLAS considers that the majority of the deposits have local importance for archaeological finds and features.

The observed archaeological deposits are of local significance, with the evaluation being a sufficient record of their existence; there is the potential for more to be learnt about the possible Roman surface observed at the base of the alluvial sequence in PDZ6.28, particularly in confirming its date and function. This represents the only possible benefit to further work in the evaluated location if impacts were to be more extensive. No further field work is recommended if the impacts remain as they are.

However, it is recommended that further work be undertaken on the samples already taken from the sequence to gain a better understanding of the local river regime, evolving past landscape and agricultural features. 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:

- The unprocessed samples are processed by paraffin flotation for the assessment of insect remains;
- The snail assemblages from the wet-sieved fractions of the samples already processed are assessed;
- Radiocarbon dates are obtained by AMS on identified twigs, seeds or other plant material likely to have received its carbon from atmospheric sources;
- The stratigraphic, dating and sample assessment data is entered into the MoLAS-PCA geoarchaeological stratigraphic database and used to update the current GIS themes;
- Research aims that might realistically be addressed by the samples are identified.

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 Capita Symonds Ltd for commissioning this report on behalf of the Olympic Delivery Authority (ODA), and David Divers (English Heritage GLAAS) for monitoring the project on behalf of the London Borough of Newham.

The site was supervised by Sarah Barrowman who would like to thank Paul McGarrity, and Sophie White for their on-site assistance, Gary Brown for his project management, and to Josephine Brown for her work on the illustrations. Additional thanks are given to Graham Spurr, Virgil Yendell and Tom Hoyle for their geoarchaeological input on site and Graham Spurr for his contributions to this report; Gary Brown, Raoul Bull and Kieron Tyler for project management and editing. In addition, thanks are due to Morrison Construction for their cooperation and assistance during the project with special thanks going to Bernie and his skill with the rubber duck and to colleagues from Capita Symonds Limited both on and off of site.

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Environmental Statement

ODA, 2007c Olympic, Paralympic and Legacy Transformation Planning Applications  
Supplementary Information: Environmental Statement Regulation 19 Further  
Information and Supplement (OLY/GLB/ACC/DOC/ENV/SUP/01A)

ODA, 2007d Olympic, Paralympic and Legacy Transformation Planning Applications  
Annexure Code of Construction Practice, Vol 15 (OLY/GLB/ACC/DOC/CCP/01)

## 9 Appendix 1: NMR OASIS archaeological report form

OASIS ID: preconst1-40141

### Project details

Project name	Olympics PDZ6, Wk PK6
Short description of the project	An evaluation of the site designated PDZ6, Wk Pk 6 as part of the London 2012 Olympic Park Development. Two trenches were undertaken to assess the archaeological potential of the area prior to construction work on a footbridge. Natural floodplain gravels were recorded at the base of the trenches, overlain in one trench by a possible Later Roman consolidation deposit, and later alluvial sediments. Furrows truncated the surface of the alluvium, buried in situ by late 19th-20th century levelling dumps.
Project dates	Start: 23-01-2008 End: 26-03-2008
Previous/future work	No / No
Any associated project reference codes	OL-08908 - Sitecode
Type of project	Field evaluation
Site status	Local Authority Designated Archaeological Area
Current Land use	Woodland 3 - Mixed
Monument type	SURFACE Uncertain
Monument type	FURROWS Post Medieval
Significant Finds	POTTERY Roman
Significant Finds	POTTERY Post Medieval
Significant Finds	GLASS Post Medieval
Methods techniques	& 'Environmental Sampling','Sample Trenches'
Development type	Not recorded
Development type	London 2012 Olympic Park
Prompt	Direction from Local Planning Authority - PPG16
Position in the planning process	After full determination (eg. As a condition)
Status	Incomplete

### Project location

Site location	GREATER LONDON NEWHAM Olympics Planning Delivery Zone 6, Works Package 6
Postcode	E15
Study area	11693.00 Square metres

Site coordinates NGR - TQ 3771 8496  
 LL - 51.5462110211 -0.01377930596860 (decimal)  
 LL - 51 32 46 N 000 00 49 W (degrees)  
 Point

Height OD Min: 3.11m Max: 3.29m

Status Incomplete

**Project creators**

Name of MoLAS-PCA  
 Organisation

Project brief MoLAS-PCA  
 originator

Project design MoLAS-PCA  
 originator

Project Gary Brown  
 director/manager

Project supervisor Sarah Barrowman

Type of Olympic Delivery Authority  
 sponsor/funding  
 body

Name of Olympic Delivery Authority  
 sponsor/funding  
 body

Status Incomplete

**Project archives**

Physical Archive LAARC  
 recipient

Physical Archive OL-08908  
 ID

Physical Contents 'Ceramics','Glass','Metal','Wood'

Digital Archive LAARC  
 recipient

Digital Archive ID OL-08908

Digital Contents 'Survey'

Digital Media 'Images raster / digital photography'  
 available

## 10 Appendix 2: Glossary

**Alluvium.** Sediment laid down 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: OL-08908 finds assessment

### 11.1 The pottery

#### 11.1.1 Roman pottery

*James Gerrard*

The only Romano-British pottery consisted of 7 fresh body sherds (63g) from a single Much Hadham Oxidised ware vessel, recovered from trench PDZ6.28, [24]. This material can be considered of late Roman date (AD 200–400) and is a not uncommon find in this region. The Hadham kilns would have been accessible by water via the River Lea.

The pottery is indicative of late Roman activity in the vicinity but otherwise is of little interpretive value.

#### 11.1.2 Post Roman pottery

*Chris Jarrett*

##### 11.1.2.1 Introduction

There are 24 sherds of pottery (and none are unstratified) from trenches PDZ6.28 and PDZ6.35; all fragments date to the late 19th and 20th centuries. The pottery is generally in a good condition with either complete or largely intact vessels represented and therefore indicates the assemblage was mostly deposited soon after breakage, and probably reflects local authority rubbish dumping. The pottery occurs in two contexts. Standard Museum of London pottery codes were used to classify the pottery and the assemblage was recorded in a database.

##### 11.1.2.2 The pottery types

Stonewares are well represented, with twelve vessels and are either from London or are of a generic English type (where stamped they have a 'Bourne Denby' mark), or have a Bristol-glaze. Stoneware forms include bottles for ink and polish, jars which have black transfer-prints with 'Virol' written on them, a bone marrow based food supplement of which there are four examples in two sizes. Other stoneware vessels comprise a large bottle stopper and jugs and jars for bought cream.

A ginger beer bottle made by Bourne of Denby is of note, it has a black transfer for CALEY and was 'by appointment to his majesty the king' and so dates context [2] in which it was found to after 1901. Transfer printed whitewares with black or brown designs comprise fourteen items which include lids for toothpaste and cold cream and Mrs Ellen Hale's heal-all ointment, besides three Sainsbury's potted meat paste pots and a jar for Hall's Patent Simplex Hektograph ink. Red transfer-printed whitewares include a lid for Dr Wrights toothpaste and a cylindrical jar for 'Pure Clotted Cream from Devonshire'.

There is also an ashtray or the base of an ornament for a public house with 'ASK FOR SCHWEPPE'S' printed on its side. Plain whitewares include a lid for PAN YAM pickle. Lithographic multi-coloured transfer printed wares include a teapot lid and an ashtray with a Johnny Walker whiskey advertisement. There is also a small shouldered jar or vase with faceted sides which is painted blue, as well as a green-glazed teapot lid. Porcelains are present with fourteen vessels, comprising two pepper casters, toy teacups, jugs and saucers and ordinary sized teacups, as well as a vase. There are also figurines in the shape of two birds, one in the form of a parrot, the other as a song bird with a lithograph transfer-printed badge depicting a seated medieval king and possibly the legend 'GOSPORT', besides a seated man playing a squeeze box.

### 11.1.2.3 Distribution

The table below shows the distribution of the pottery in the contexts it was recovered from, the number of sherds and a spot date for each deposit.

Trench	Context	Sherd count	Spot date
PDZ6.35	[2]	23	1901+
PDZ6.28	[16]	21	1869+

Table 4 Post Roman pottery spot dating index, site OL-08908

### 11.1.2.4 Significance, potential and recommendations for further work

The significance of the pottery is at a local level and demonstrates what types of activity were happening. The ceramic profile of the site largely follows that for what would be expected locally and comparable ceramic assemblages can be found on other excavations in North East London and other 2012 Olympic excavation sites, OL-04307 for example. These industrial period ceramics are probably mostly derived from a source off of the site and their presence is largely the result of refuse dumping. However, there are a number of vessels of interest either as domestic items or because they were used for advertising or as containers for mercantile products.

The main potential of the pottery assemblage is as a dating tool for the contexts it occurs in and a number of vessels merit photographing. Recommendations for further work should be that this assemblage is included in a publication report combining all the late 19th/20th century ceramics from the Olympic site excavations discussing the types of pottery and the reasons for their presence on the site. Photographs of the more unusual items will help to illustrate the text and enhance the publication

## 11.2 The clay tobacco pipe

*Chris Jarrett*

### 11.2.1 Introduction

A small assemblage of clay tobacco pipes (four stratified bowls) was recovered from Trench 28. The typology used to classify the bowls follows Atkinson and Oswald (1969). The clay tobacco pipes are in a good condition and therefore were probably deposited soon after being discarded, but possibly under secondary or tertiary

conditions as a result of local authority refuse dumping. The information was entered onto a database. The main potential of the minimal amount of tobacco pipe is to date the contexts it was found in, which were all landfill deposits, probably deposited from dumping of refuse on the site.

### **11.2.2 Distribution**

There are two AO30 bowls (both from context [2], PDZ6.35) and one has a snake winding down each side of the bowl with their heads and tongues finishing on the stem. The second AO30 bowl has a foliate drape on the front of the bowl below a crowned pair of possible dividers and therefore may represent Masonic paraphernalia. AO30 bowls date to after *c* 1850. From context [16] there are two bowls; the first is a tall AO29 version, dated 1840–1880 and is of a thorn type. The second bowl is an Irish type (AO33), dated from *c* 1840 and is decorated with a rope cordon positioned a third of the way from the top of the bowl and below the cordon are random dots in relief. Its spur is missing.

Trench	Context	Sherd count	Spot date
PDZ6.35	[2]	2	1850–1910+
PDZ6.28	[16]	2	1840–1880

*Table 5: CTP index with spot dates for site OL-08908*

### **11.2.3 Significance, potential and recommendations for further work**

The clay tobacco pipes have some significance at a local level, as they are unusual types not frequently encountered on archaeological excavations and almost certainly date to the late 19th century or later when refuse was collected by local authorities and no longer dumped in back garden rubbish pits. Their main potential is to date the contexts they were found in and they require illustrating or photographing. It is recommended that the pipes from this excavation be incorporated into a publication on all the interesting clay tobacco pipes from the other 2012 Olympics excavations.



## 12 Appendix 4: context index

Context No.	Plan	Section / Elevation	Type	Description	Date	Phase
1	-	S1	Layer	Dump Deposit	Victorian-Modern	7
2	-	S1	Layer	Dump Deposit	Victorian-Modern	7
3	-	S1	Layer	Relict Topsoil	Uncertain	6
4	-	S1	Layer	Clay	Uncertain	5
5	-	S1	Fill	Fill of [6]	Uncertain	5
6	-	S1	Cut	Filled with Re-Deposited Clay	Uncertain	5
7	-	S1	Natural	Alluvial Clay	Uncertain	4
8	-	S1	Natural	Alluvial Clay	Uncertain	4
9	-	S1	Natural	Alluvial Clay	Uncertain	4
10	-	S1	Natural	Fluvial Sand	Uncertain	4
11	-	S1	Natural	Fluvial Clayey-Sand	Uncertain	4
12	-	S1	Natural	Alluvial Clay	Uncertain	4
13	-	S1	Natural	Fluvial Clay & Sand Lenses	Uncertain	4
14	-	S1	Natural	Fluvial Sand	Uncertain	1
15	PDZ6.35	S1	Natural	Gravel	Uncertain	1
16	PDZ6.28	S2 S3	Layer	Dump Deposit	Victorian-Modern	7
17	-	S2 S3	Natural	Alluvial Clay	Uncertain	4
18	-	S2	Fill	Fill of [22]	Uncertain	6
19	PDZ6.28	S2 S3	Natural	Alluvial Clay	Uncertain	4
20	-	S2	Fill	Fill of [21]	Uncertain	6
21	PDZ6.28	S2	Cut	Filled with Re-Deposited Clay	Uncertain	6
22	-	S2	Cut	Filled with Re-Deposited Clay	Uncertain	6
23	PDZ6.28	S2 S3	Natural	Alluvial Clay	Uncertain	4
24	-	S2 S3	Natural	Sandy-Gravel	Roman (AD 200–400)	2
25	PDZ6.28	-	Natural	Gravel	Uncertain	1
26	PDZ6.28	-	Layer	Possible Surface	Uncertain	3
27	PDZ6.28	S3	Fill	Fill of [28]	Uncertain	5
28	PDZ6.28	S3	Cut	Filled with Re-Deposited Clay	Uncertain	5
29	-	S3	Cut	Furrow	Uncertain	6
30	PDZ6.28	S3	Cut	Furrow	Uncertain	6

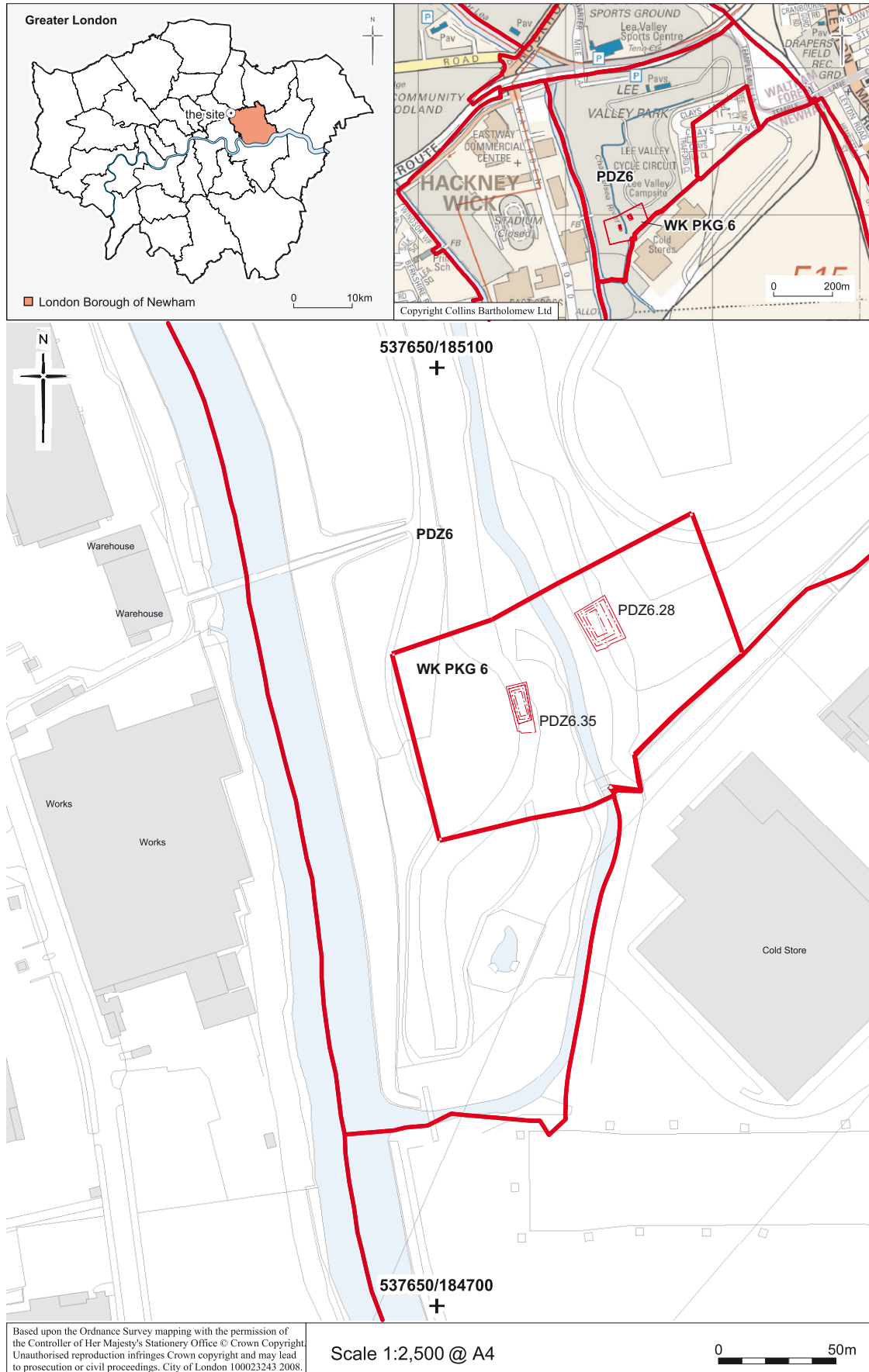
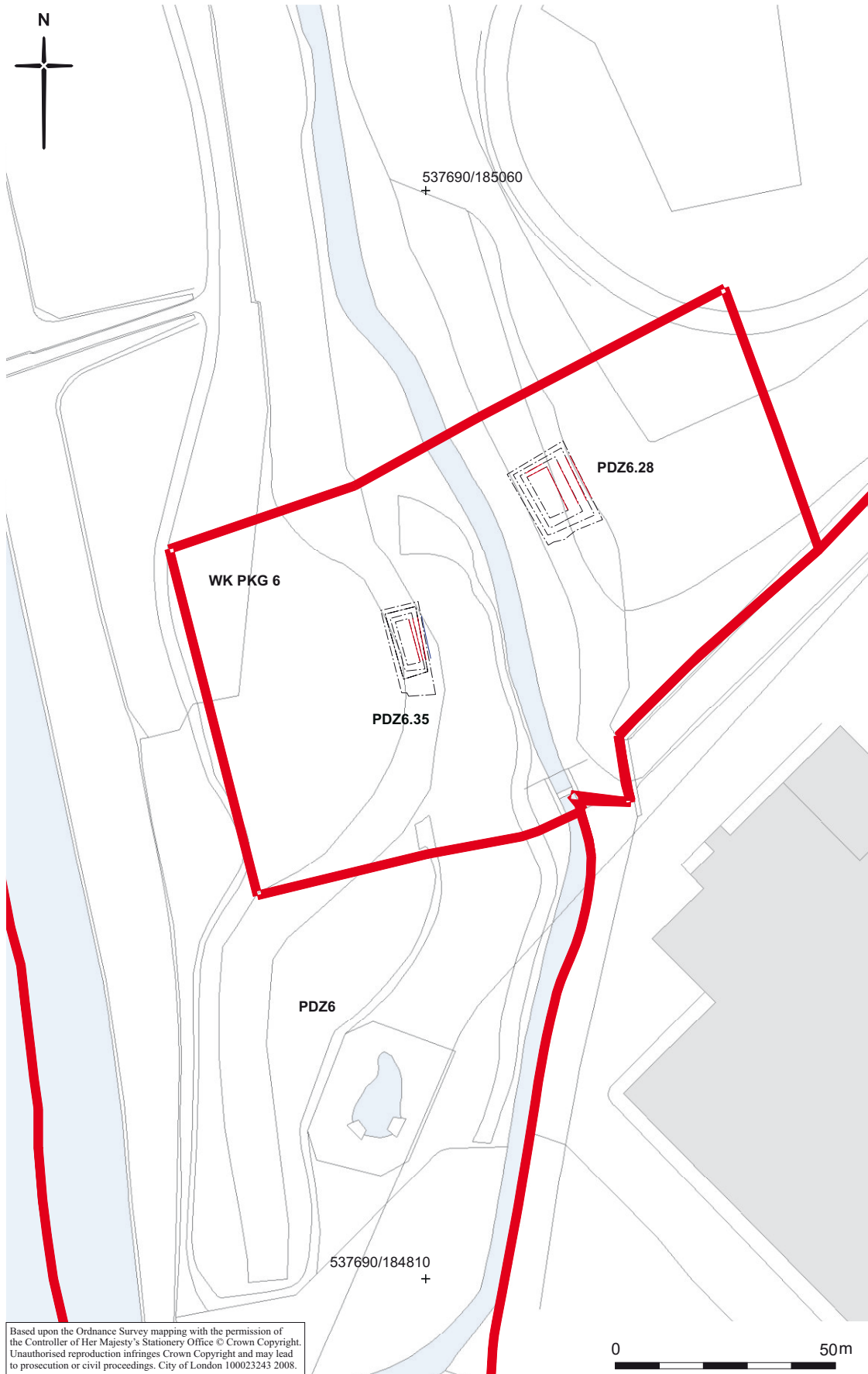


Fig 1 Location map



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Fig 2 Trench locations

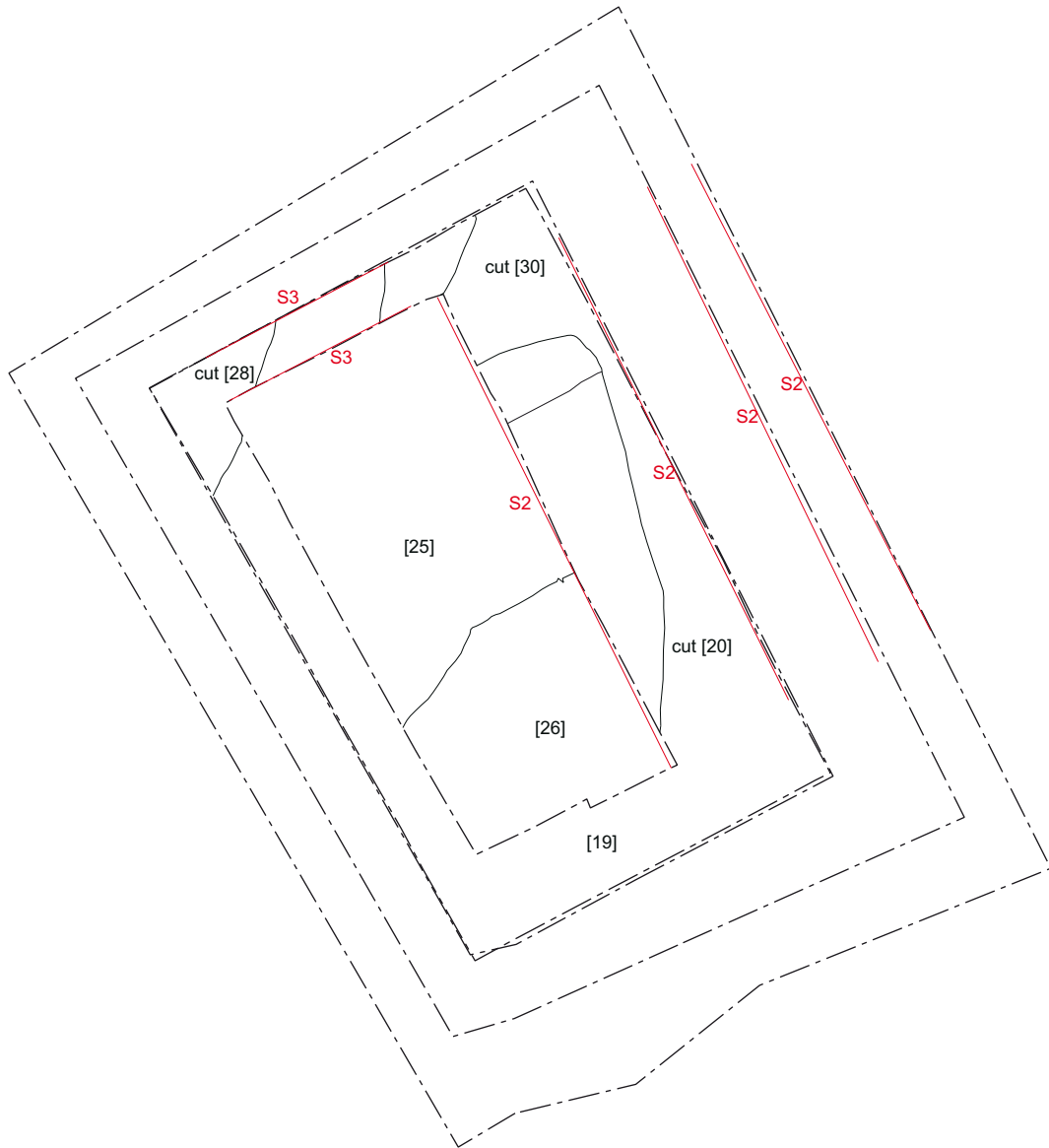


Fig 3 Plan of Trench PDZ6.28

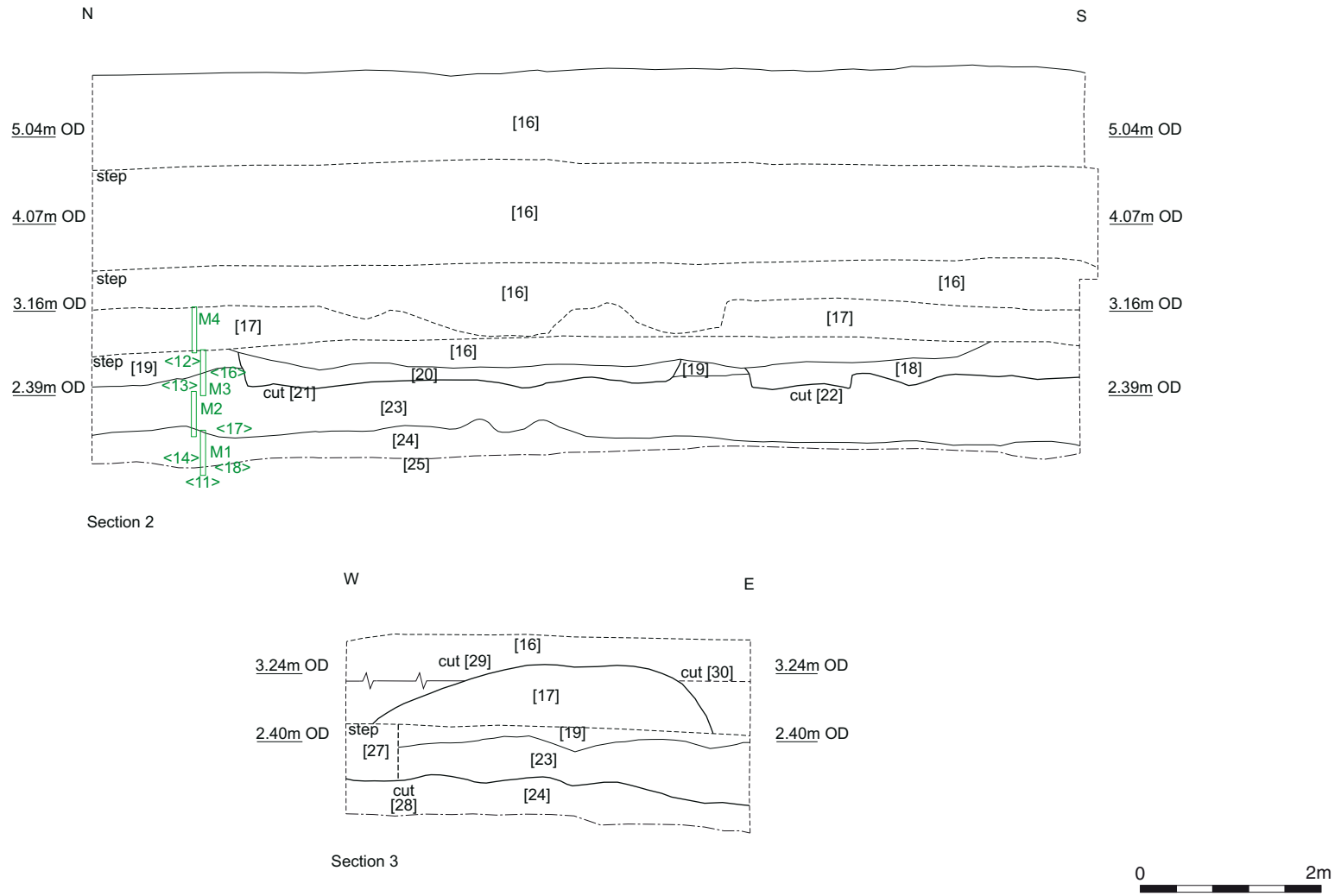


Fig 4 West facing Section 2 and south facing Section 3 of Trench PDZ6.28

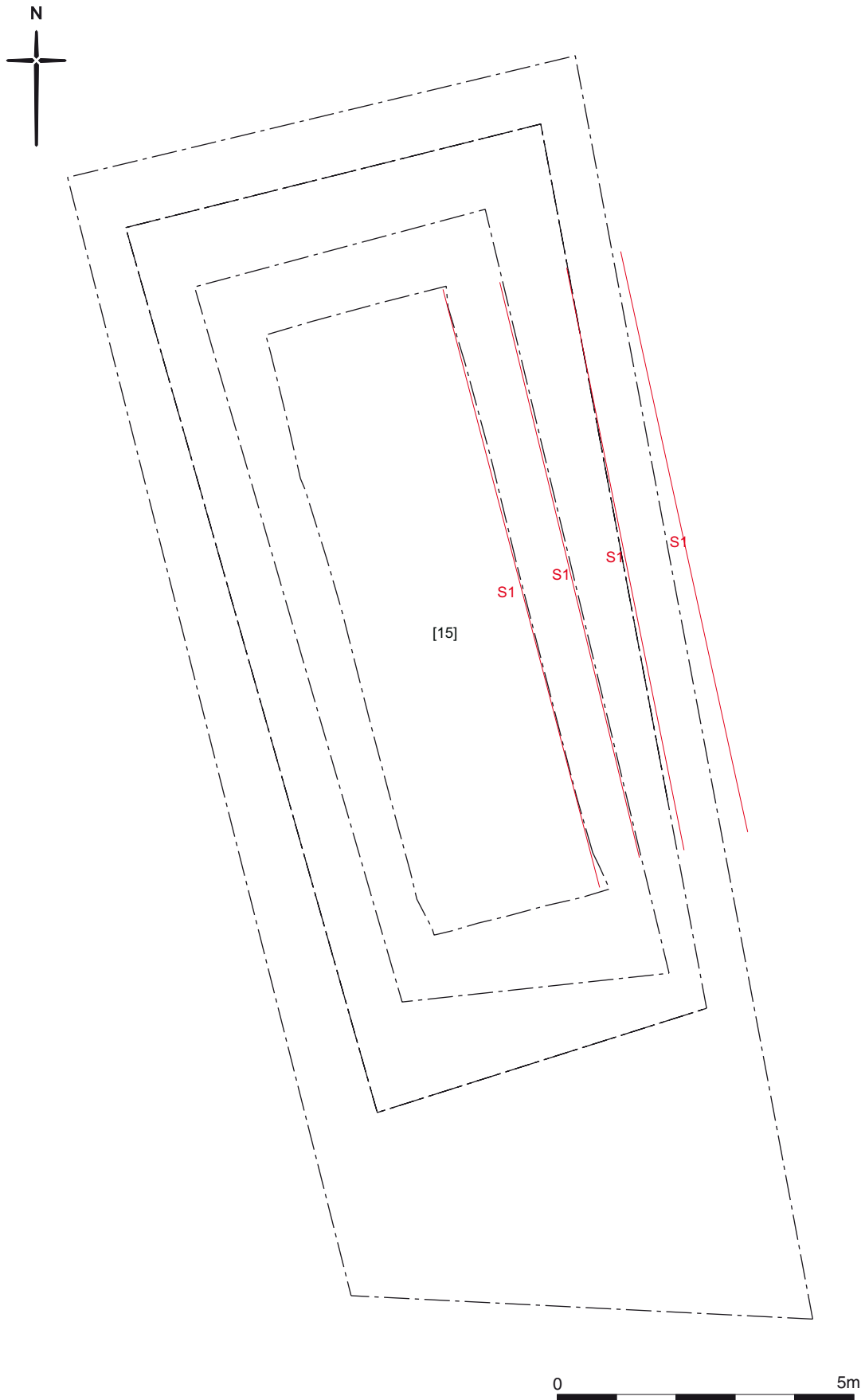


Fig 5 Plan of Trench PDZ6.35

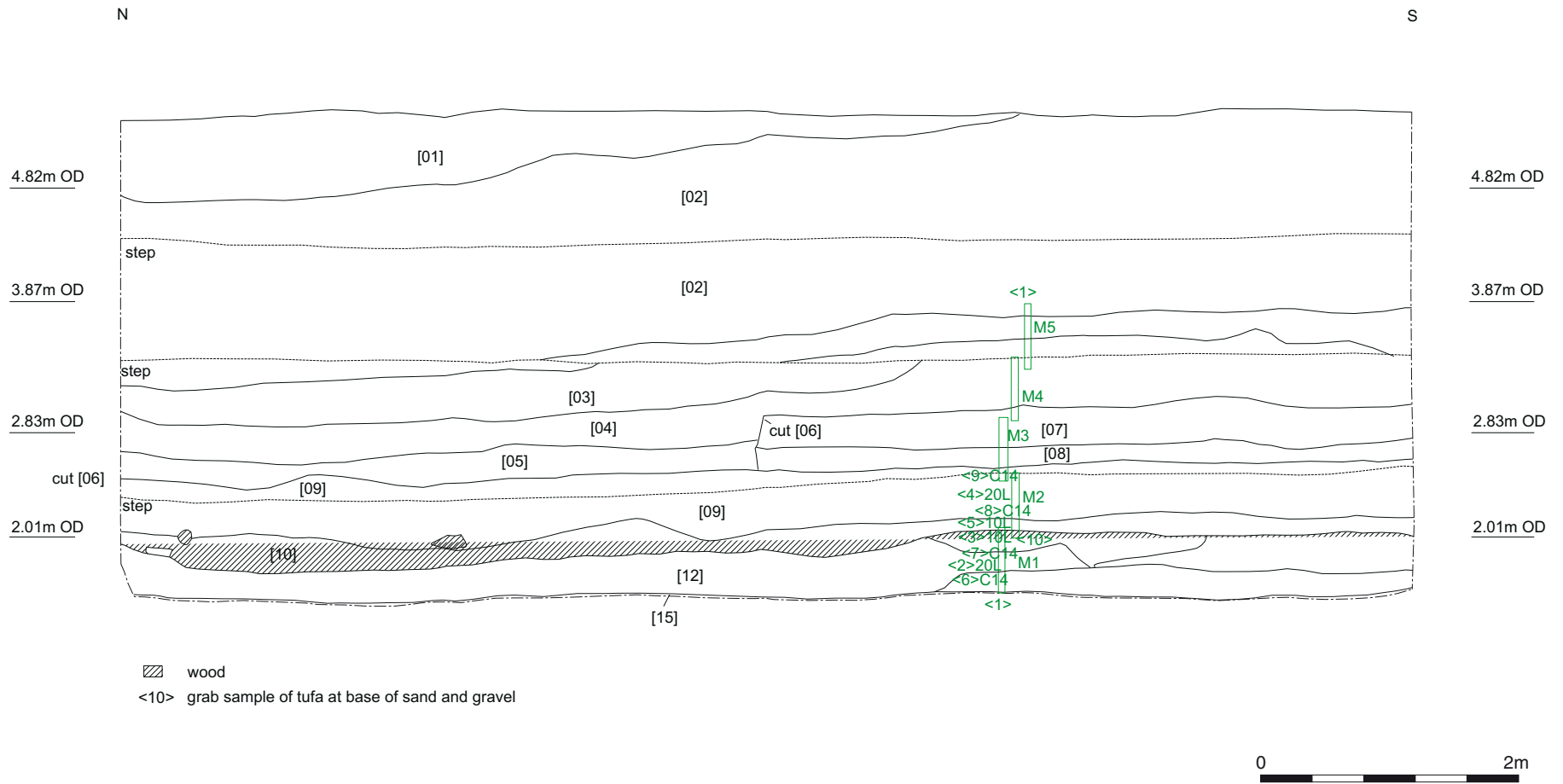


Fig 6 West facing Section 1 of Trench PDZ6.35