



C261 ARCHAEOLOGY EARLY EAST
Interim Statement
Archaeological Evaluation
EIP/TBM Chamber
Pudding Mill Lane
XSK10

Document Number: C261-MLA-X-RGN-CR140-50057

Document History:

Revision:	Date:	Prepared by:	Checked by:	Approved by:	Reason for Issue:
1	02.12.11	[REDACTED]	[REDACTED]	[REDACTED]	For CRL Review
2	20.03.12	[REDACTED]	[REDACTED]	[REDACTED]	Includes comments from document review sheet – C261-MLA-X-XCS-CR140-50001 V1
		[REDACTED]	[REDACTED]	[REDACTED]	

Document uncontrolled once printed. All controlled documents are saved on the CRL Document System

© Crossrail Limited

RESTRICTED

C261 Interim Statement PML Eval XSK10 v2 20.03.12.doc

CROSSRAIL REVIEW AND ACCEPTANCE STATUS	
This decal is to be used for submitted documents requiring acceptance by CRL.	
<input checked="" type="checkbox"/>	Code 1. Accepted. Work May Proceed
<input type="checkbox"/>	Code 2. Not Accepted. Revise and resubmit. Work may proceed subject to incorporation of changes indicated
<input type="checkbox"/>	Code 3. Not Accepted. Revise and resubmit. Work may not proceed
<input type="checkbox"/>	Code 4. Received for information only. Receipt is confirmed
Reviewed/Accepted by:(signature)	[REDACTED]
Print Name:	[REDACTED]
	Date: 13-APR-12
Acceptance by CRL does not relieve the designer/supplier from full compliance with their contractual obligations and does not constitute CRL approval of design, details, calculations, analyses, test methods or materials developed or selected by the designer/supplier.	

This document contains proprietary information. No part of this document may be reproduced without prior written consent from the chief executive of Crossrail Ltd.

Document uncontrolled once printed. All controlled documents are saved on the CRL Document System

© Crossrail Limited

RESTRICTED

C261 Interim Statement PML Eval XSK10 v2 20.03.12.doc

CROSSRAIL REVIEW AND ACCEPTANCE STATUS		
This decal is to be used for submitted documents requiring acceptance by CRL.		
<input type="checkbox"/>	Code 1.	Accepted. Work May Proceed
<input type="checkbox"/>	Code 2.	Not Accepted. Revise and resubmit. Work may proceed subject to incorporation of changes indicated
<input type="checkbox"/>	Code 3.	Not Accepted. Revise and resubmit. Work may not proceed
<input type="checkbox"/>	Code 4.	Received for information only. Receipt is confirmed
Reviewed/Accepted by:(signature)		
Print Name:		Date:
Acceptance by CRL does not relieve the designer/supplier from full compliance with their contractual obligations and does not constitute CRL approval of design, details, calculations, analyses, test methods or materials developed or selected by the designer/supplier.		

This document contains proprietary information. No part of this document may be reproduced without prior written consent from the chief executive of Crossrail Ltd.

Document uncontrolled once printed. All controlled documents are saved on the CRL Document System

© Crossrail Limited

RESTRICTED

C261 Interim Statement PML Eval XSK10 v2 20.03.12.doc

Contents

1	Introduction	4
2	Aims and Objectives	5
2.1	Fieldwork Objectives	5
3	Provisional Results	6
3.1	Evaluation Trench 1	6
4	Significance of Results (<i>provisional</i>)	10
4.1	Summary of Fieldwork Results.....	10
4.2	Importance of Resources	10
4.3	<i>Provisional</i> Assessment of Results against Aims and Objectives	10
4.4	<i>Provisional</i> conclusions for future work	11
5	Future Deliverables	12
6	Appendix 1 – Timber Report.....	13
7	Appendix 2 – Location Plan.....	16

Figures

(in Appendix 2 at back of document)

Fig 1 Location of Evaluation trench

List of Photos

Photo 1 Timber structure [28] with water-worn tops, exposed beneath 2m of alluvium, 22nd November 2011, looking west	6
Photo 2 Oblique overview of timber structure, 23 rd November 2011 looking north-west	9



1 Introduction

An archaeological evaluation was carried out at Pudding Mill Lane Portal by the C261 Museum of London Archaeology (MOLA).

It was conducted between Monday 7th November and Friday 25th November 2011 and supervised by D Sankey, MOLA Senior Archaeologist.

It was recorded under event code (sitecode) XSK10.

This document is an interim statement of the results of the fieldwork one week after the end of fieldwork. More extensive background, results, and conclusions will be included the Fieldwork Report which will be submitted within six weeks of the end of fieldwork (Crossrail, *Archaeology, Specification for Evaluation & Mitigation (including Watching Brief, Doc. No. CR-PN-LWS-EN-SP-00001, v. 0.3, 26.06.09)*).

All levels in this document are quoted in metres Above Tunnel Datum (m ATD). To convert Tunnel Datum to Ordnance Datum subtract 100m, ie 1m OD = 101m ATD.

The fieldwork was carried out in accordance with:

- A Crossrail **Site-specific Written Scheme of Investigation** (SS-WSI): *Package C152 Pudding Mill Lane Portal, Archaeology Site-specific Written Scheme of Investigation, Doc. No. C152-SWN-C2-RSI-CR094_PT002-0001 Version 10, 12.05.10 (Crossrail 2010a)*
- An **Addendum to the WSI**: *C152 – Pudding Mill Lane Portal, Addendum to WSI: Test pit Evaluation, Watching Brief & Detailed Excavation [sic] (XSK10), Doc. No. C152-SWN-C2-RSP-CR094_PT002-50001 Revision 2.0, 12.08.11 (Crossrail 2010b)*
- MOLA, C261 Archaeology Early East, **Method Statement for Archaeological Test Pit Evaluation at Pudding Mill Lane: Addendum to document C261-MLA-X-RGN-CR140-500036, Doc. No. C261-MLA-X-RGN-CR140-50044], Version 3, 21.10.11**

2 Aims and Objectives

Site Specific Fieldwork Objectives were set out in the Addendum to the WSI: Trial Trench Evaluation Watching Brief & Detailed Excavation (XSK10), Doc No: C152-SWN-C2-RSP-CR094_PT002-50001, section 2.2, p5.

2.1 Fieldwork Objectives

1. To record evidence for post medieval industrial buildings and structures noted in the DDBA and in particular the remains of a large building with landscaped grounds recorded in the 1867 OS edition (within section 1 of the cut and cover tunnel).
2. A geoarchaeological sampling strategy will be devised in association with the EH regional science advisor to determine how the deposits vary across the landscape and through time.
3. To analyse the palaeo-environmental evidence recovered from the works and contribute evidence to inform our knowledge of the Lea Valley Pleistocene and Holocene archaeological resource.
4. To inspect the sequence of post Pleistocene alluvial organic deposits and clay silt units for prehistoric, Roman, and medieval archaeological remains at channel edge and areas of higher ground (land and channel management, settlement and industry).
5. To identify, record and, if appropriate, recover any archaeological artefacts (vessels, structural remains and small finds) preserved in the deeper channel areas.

3 Provisional Results

See Fig 1 for trench location

3.1 Evaluation Trench 1



Photo 1 Timber structure [28] with water-worn tops, exposed beneath 2m of alluvium, 22nd November 2011, looking west

Evaluation Trench 1	
Location	EIP/TBM chamber, west of 11kve-cable box
Dimensions	7.0m x 6.0m x 3.0m deep
Modern Ground Level/top of the slab	104.58m ATD
Modern subsurface deposits	In much of the trench, deep modern concrete intrusions were more than 4m deep. However, in an area adjacent to the 11kve-cable box, horizontal truncation by modern reinforced concrete intrusions was at 1.13m below ground level, with concrete driven piles through archaeologically significant layers below

	this level
Level of base of archaeological deposits observed	Lowest level of alluvium at 100.45m ATD, exposed in a hand-dug sondage beneath the base of the trench (101.45m ATD)
Natural observed (truncated/not truncated ?)	Alluvium [8] 103.45m ATD (truncated by modern construction) periglacial river-terrace gravel [29] at 100.45–100.50m ATD (truncated by the Holocene river Lea bed)
Extent of modern truncation	1.13m→4.5m bGL
Archaeological remains	Dating Evidence, Finds, and Samples
Periglacial terrace gravels [29] were exposed in the northern part of the trench, but an organic peaty mud [13], 80mm thick, survived at 100.53m ATD to the south. These were directly overlain by grey organic alluvial clay [12] from 101.33m ATD (south), 101.05m ATD (north). Overlain by [11] ...	Samples: Monoliths M7 and M8, and bulk samples <7> (part), <8> [12] and <9> [13]
A north-west–south-east aligned double row of driven posts and stakes [28], with oak posts <300mm diameter and <1.7m-long, with tops worn smooth by water action at 101.65m ATD. The channel bed they were driven into was at 101.35m ATD and the larger posts were driven <500mm into natural terrace gravel. They were driven into the earlier part of [11] (see below) and [12], and the later part of [11] had accumulated around them ...	Samples: Timber <10> to <19>, inclusive
A bedload deposit of grey sandy organic clay [11] with frequent small molluscs and small pebbles. 140–700mm thick, exposed at 101.65m ATD (north) and 101.49m ATD (south). It had accrued around the tops of timber posts [28], and the sand fraction was responsible for the abrasive action that had worn timbers away. Overlain by ...	Late medieval or post-medieval Ceramic Building Material: pieces of roof tile (to be dated but peg tiles were made 13th- to 18th-century) Samples: Monolith M6 and bulk samples <6> part <7>
Up to 1.0m of grey organic alluvial clay [10]. Overlain by ...	Samples: Monoliths M4 and M5 and bulk samples <4> and <5>
Dark grey organic sticky alluvial clay [8] exposed at 103.45m ATD (the level to which it had been truncated by modern construction), overlay a bedload deposit 80mm-thick [9], of rougher sandy	Ceramic building material: 17th to early 19th-century bricks (site identification) Samples: Monoliths M1, M2, and M3, bulk samples <1>, <2> and <3>

<p>organic alluvium with frequent molluscs and with brick fragments with added coal dust (discarded), at 102.53m ATD.</p>	
<p>Interpretation and summary</p>	
<p>The lower alluvium [12] is undated and specialists may advise on the possibility, or otherwise, of using carbon dates on the underlying peaty deposit [13]. They are deposits from the migrating River Lea, or its tributaries. Coarser-grained bedload deposit [11] is approximately dated to the late medieval period or post-medieval period by the presence of roof tile fragments. It is both the deposit that timber structure [28] was driven into, and accreted around it. Within this deposit it is possible to discern coarser and finer lenses and it is clear that it marks the bed of a channel with flowing water (tile was horizontally lain and flow was broadly north to south, as indicated by the 'middle-axis' direction).</p> <p>The fact that wooden post structure [28] was driven into flowing water is indicated by the water-worn tops of timbers. They also indicate both that the flow was considerable and that they were exposed for a considerable time at this level. Although two lines of posts were exposed the gap between them is insufficient to indicate its use as a jetty or bridge. A greater area would need to be exposed at this level to determine this. However, it is possible that a narrow timber structure may have been built across a main channel for defensive reasons (Damian Goodburn pers. comm.)</p> <p>Approximately 2.5m of alluvium accumulated within a relatively short period, with clay [10] overlying the top of the rotted posts [28] and a further channel bed at 102.5m ATD [9]. This contained late 17th-century, or more probably, 18th-century brick fragments. It is impossible to determine whether this is from a man made or a natural channel. The channel fill [8] continued to 103.45m ATD, the level at which it had been truncated. Original water level was considerably higher, and is thought to have been tidal.</p>	



Photo 2 Oblique overview of timber structure, 23rd November 2011, looking north-west

4 Significance of Results (*provisional*)

4.1 Summary of Fieldwork Results

Archaeological remains have been truncated variably, from as little as 1.13m below ground level to over 4.0m below ground level. Large numbers of pre-formed concrete piles and large augered piles have been driven through alluvium, where it survives. Natural, periglacial river-terrace gravel was found at 100.50m ATD, truncated by the Holocene River Lea bed. The surface of the alluvium survived generally up to 103.45m ATD.

Archaeological fieldwork results may be divided into two distinct types. The first result of the fieldwork is a continuous and consistent sequence of samples of 3m of alluvium (Fieldwork Objectives 2 and 3, above). The second significant result is a structure of roughly parallel timber posts. The only dating apparent at the moment is that they are later than the 13th century, as the river bed through which they were driven contained tile fragments. They may be considerably later than this, although an upper limit in the date range may be in the 17th century, if one considers them to have been driven within the main channel of the River Lea. There is reason to think this may be so as the tops of the timbers have been worn away by water action and the scouring effect of bed-load particles. If we also take into account the location of the river with the better located early maps, it looks like the river was further west of this point at the beginning of the 18th century (Gascoyne 1703 map, illustrated in the Archaeological Desk-based Assessment, Document Number: CR-SD-CT1-EN-SR-00001). Large timbers were cut as roundwood limbs or small trees. They were left with the bark attached and the points were hewn. One method applied was to trim the point as a square conversion and then to chamfer the edges (for ease of handling and “health and safety”). Others simply had a rough hewn round point. Two timbers appear to have remnants of metal fastenings, nails, etc. Three tile fragments have been retained for examination by a ceramic building materials specialist.

4.2 Importance of Resources

The archaeological remains identified in the fieldwork are provisionally assessed as being of moderate importance, because they may shed light on the late-medieval or post-medieval development of the site. The remains appear largely confined to the one period, although the organic layer immediately above Terrace Gravels may be considerably older. The full value of this will be realised when the samples have been assessed and examined for pollen, diatoms and foraminifera, as well as any macrofossil remains, such as seeds. The real significance of results depends on interpretation and a greater degree of precision in dating. A Tudor or War of the Roses defensive work may be considered of greater significance than (for instance) a 17th-century jetty or estate bridge.

4.3 *Provisional* Assessment of Results against Aims and Objectives

Comparing results with Fieldwork Objectives outlined above:

1. *To record evidence for post medieval industrial buildings and structures noted in the DDBA and in particular the remains of a large building with landscaped grounds recorded in the 1867 OS edition (within section 1 of the cut and cover tunnel).*
 - is not relevant to the evaluation, which was confined to the EIP trench

2. *To inspect, record and sample profiles in the geo-archaeological sequence of deposits present within the site to understand the topography and date to its phased development.*
 - a long sedimentary sequence has been recorded at this location
3. *To analyse the palaeo-environmental evidence recovered from the works and contribute evidence to inform the Lea Valley Pleistocene and Holocene archaeological resource.*
 - requires analysis of monolith and bulk samples, as well as timber samples.
4. *To inspect the sequence of post Pleistocene alluvial organic deposits and clay silt units for prehistoric, Roman, and medieval archaeological remains at channel edge and areas of higher ground (land and channel management, settlement and industry).*
 - a structure has been recorded, either late medieval or, more likely, of 15th to 17th-century construction.

4.4 Provisional conclusions for future work

The whole area of the EIP/TBM trench will be cleared to the depth at which timbers were recorded and monitored by the MOLA Supervisor. Any further structural elements will be excavated archaeologically and further samples taken.



5 Future Deliverables

The remaining deliverables for the site, and their delivery dates as specified by *Crossrail, Archaeology, Specification for Evaluation & Mitigation (including Watching Brief, Doc. No. CR-PN-LWS-EN-SP-00001, v. 0.3, 26.06.09*, are:

- **Survey Report** by Friday 9th December 2011
- **Fieldwork Report** (including OASIS) by 13th January 2012 – **if required** as a separate report – may instead be incorporated into the Fieldwork Report for the excavation phase (if agreed by Project Archaeologist)
- **Summary Report** by 27th January 2012

6 Appendix 1 – Timber Report

The site visit by Damian Goodburn, MOLA Timber Specialist was conducted on Thursday 24th November 2011.

This provisional report is derived from notes and sketches made during a visit to the Pudding Mill Lane site on the afternoon of Thursday 24/11/2011. The writer was commissioned (by C. Halsey of MOLA) to give advice on the initial interpretation, broad dating, recording and sampling of waterlogged historic timbers found in the east–west evaluation trench then under way.

The partially exposed timbers lay beneath at least 1.5m of clay silt alluvium with thin layers of gravelly foreshore deposits set at intervals. The vertically set timbers were examined *in situ* where what could be seen was the top 150mm or so, and in a sondage the whole of one side of a pile. Notes and sketches were then made, and copies of historic maps of the area were also scanned. A meeting between MOLA Assistant Contract Manager, Craig Halsey, Crossrail Project Archaeologist, Jay Carver and GLAAS Advisor, Jane Siddell discussed possible dating of the structure, future sampling and the need to extend the trench to fully examine to determine the function of the structure.

6.1 The range of woodwork already found in the lower Lea Valley

The writer has worked in many of the wetland zones of Greater London and the South-east and as a result has gained wide spread experience of a variety of historic and prehistoric waterlogged woodwork, some of this work is in the process of being published. Recently investigations in the lower Lea Valley, has produced a wide variety of wooden structural remains. This material covers all periods from later prehistory to the early Industrial Age, and much of it is currently not yet published in any detail. Therefore it can be reasonably suggested that in most places in the lower Lea Valley–Stratford Area any excavation below c 102.5m ATD may expose historic waterlogged woodwork, and beneath around 101m ATD earlier prehistoric woodwork may also be found. Apart from the very latest periods when structures such as mills and docks may be shown on detailed maps, the finds are very unpredictable due to the rapidly changing nature of the natural and artificial multiple channels of the tidal zone river, and masking by alluvial deposits and land-fill.

The historic structural woodwork found in the Lower Lea region has included; timber and wattle-work river, dock and wharf frontages, timber-lined mill channels, timber fitted lock elements, timber drains and pipes, the base of Roman timber gates, timber and wattle-lined industrial pits of all periods, timber and wattle-work building remains (including a small crannog of the 5th century AD), dugout boats, planked boat remains, reused nautical timbers, probable fish traps, lined saw-pits, and remains of linear structures including bridges, jetties and timber-reinforced causeways. The possibility of any of these features and others turning up masked by alluvium or land-fill must be born in mind during the excavation of future Crossrail trenches in the vicinity, and indeed the extension of the current trench under discussion here.

6.2 The general nature of the timber structure

These notes have to be viewed as provisional, as the structure was not fully exposed and there has not yet been time to record a representative number of the timbers involved in detail. The material has been planned, levelled and photographed *in situ*. During the visit a total of 17 timbers were seen, three of which had been broken and machined out sometime before. The timbers *in situ* were whole log uprights and most, if not all, of them appeared to be driven piles. The 14 piles were laid out in a slightly irregular east–west line, at roughly right angles to the current course of the River Lea about 50m to the west. The main alignment comprised about 10 of the piles, but the spacing suggested more than one phase of work, as did the fact that at least two (and one machined out) were of the elm family. The other piles in the main east–west line, which was exposed over c 4m were made from minimally-trimmed oak logs c 100–130mm in diameter. A small number of oak piles and a smaller diameter non-oak or elm (willow??) stake to the south lay, off the main line by up to c 0.5m. This irregular spacing and the use of three different species suggests to this writer that there was at least three phases of building and repair.

One of the oak piles of the main line had been box sectioned and the long tapering, axe-hewn tip could be seen. In the western section a level around 100.8m ATD had been exposed by hand, leaving the water eroded tops of the piles clearly visible at just above that level. The tops were worn to a point due to the solid nature of the oak heartwood core and soft outer sapwood layer. It was decided that four or five of the piles that could be carefully dug out would be taken as a sample for more detailed recording and sampling for tree-ring and or radiocarbon dating. Unfortunately the axe marks visible on the round log piles are not particularly dateable, other than to note they are not prehistoric or recent. No more dateable jointing or fastenings have been seen so far.

6.3 A possible date range for the structure

The working of the timbers cannot, as currently known, provide a date range for the pile alignments, but a small amount of abraded late medieval style roof tile was visible in gravelly lenses within the alluvium through which the piles had been driven. The use of elm piles is rare in closely-dated London area structures before the late 13th century, becoming ever more common until the 16th century when it was widely used as timber and in log form. The lack of marking of an east–west structure or routeway on the east side of the river at this point is also suggestive of a date before detailed map making in the 17th century. The timber is also rather solid. So currently a date range from the late medieval to 17th century periods would seem likely, with a likelihood of a 16th century date being strongest as it was a period when the use of the River Lea is known to have expanded rapidly.

Although relatively small piles in the round, if slow grown the oak timbers might just have enough rings for tree-ring dating, but it may be that radiocarbon dating will provide the closest date.

6.4 The possible function of the original structure

Lines of round log piles are found used for many purposes on archaeological sites in London. The upper parts of these piles have been eroded away by water. To be above the higher spring tides in the 16th century, for example, they would have had to extend up to c 2.5–2.8m, judging from dated levels of foreshore structures at the mouth of the River Lea a short distance to the south.

Their location and the stratigraphy suggest they were not foundation piles, at 90 degrees to the river they could not have functioned as river wall revetment piles either. Earth-cut dock inlets such as have been found recently of 16th to early 18th century date on River Lea tributaries have more or less revetted sides at 90 degrees to the main watercourses, but the stratigraphy does not seem to indicate that this was the case here. Pile lines can also be associated with mill dams or defensive blockages of watercourses, but in this case the stratigraphy renders these functions very unlikely. By a process of elimination by far the most likely original function of the pile line as part of a simply-built jetty or bridge. Parts of an earlier mid Saxon jetty or foot bridge were indeed found associated with the Channelsea arm of the Lower Lea delta. There round log piles were the main elements that would have survived at river bed level.

6.5 Very tentative pointers to links with an historic 'wick' site??

As there does not appear to be an historic route way that crossed the river flood plain at this point, according to the early maps, we might suggest it was short lived if a bridge, or possibly that it was a jetty and also relatively short lived. The main Lea channel has been eroding westward at this point for hundreds of years, and so we might also consider the possibility that the pile alignment might be part of a jetty springing from the earlier historic west rather than east bank. Here the map evidence may possibly be more helpful, as on the west side at roughly the right point a lane named Wick Lane touches the west side of the channel. Could this be an historic 'wick' (Saxon Market site) site as in Aldwich, Greenwich, etc? Then the hypothetical jetty might make sense as a place to unload small coastal and riverine craft at a point where even neap tides probably provided enough water for access (c 1m in Late Saxon times ?). Of course, in this case the possible jetty would have been a later manifestation of a Late Saxon beach market site built out to accommodate larger vessels in a silting channel.

Following discussions on site it was agreed that the extension of the trench to north and south was essential to find the limits of the jetty in the form of another pile line or more. The width would indicate whether it had been intended for foot only or also cart access. During that process it ought to be possible to obtain some more dating evidence.

6.6 A provisional assessment of the relative importance of the timber structure found

There is well know information about the port and riverside infrastructure of later medieval and early post-medieval London, but very little about the nature of the once-rural wharves, trading jetties and other structures used around what is now outer Greater London. It is clear that further work and the completion of recording and sampling will also contribute to providing a clearer picture of the lower Lea Valley that is being gained from other archaeological work close by linked to the Olympic and other developments. So the structure must fairly be viewed as of local and regional interest.



7 Appendix 2 – Location Plan

(to be inserted in the PDF version of this document)



Site code: XSK10
 Figure type: Interim

Based upon the Ordnance Survey mapping with the permission of the Controller of Her Majesty's Stationery Office © Crown Copyright. Unauthorised reproduction infringes Crown Copyright and may lead to prosecution or civil proceedings. TFL 100032379 2010.

Type of fieldwork:
 Evaluation
 Site Address:
 Crossrail: EIP Chamber
 Pudding Mill Lane
 London

- Archaeological Investigation Area
- Trench edge
- Archaeological timbers
- π GNSS derived levels (for levels ATD add 100m to OD height)