C263 ARCHAEOLOGY LATE EAST

Fieldwork Report

Archaeological Evaluation and Watching Brief

Victoria Dock Portal XSX11

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Non-technical summary

This report covers three evaluation trenches, and a targeted watching brief carried out by the Museum of London Archaeology (MOLA) on the western half of the portal by Royal Victoria Dock, London Borough of Newham. The report was commissioned from MOLA by Crossrail Ltd.

Three trial trenches and a targeted watching brief afforded the opportunity to record and sample the sequence above the Pleistocene Thames gravels (from 96.70m ATD). The sequence consisted of evidence for a meandering river of potentially early Holocene date, with tidal creeks forming adjacent to it. Wood peats formed during the Neolithic and Early Bronze Age periods, before rising sea level in the Late Bronze Age and later periods inundated the area to deposit alluvial deposits in an estuarine floodplain. Of interest is the evidence for a fluvial or extreme weather event at the eastern end of the site.

No artefacts or structures were recovered.

Archaeological works were not carried out on the eastern half of the portal, which comprised the ramp up onto the surface section of the route, as the impact of the engineering works was largely limited to the archaeologically sterile historic alluvium in the upper part of the deposit sequence.

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1 Introduction

Crossrail is a new cross London rail link project which will provide transport routes in the south-east and across London. The proposed development will include the construction of seven stations within central London which will have interchange with other public transport modes including the London Underground, National Rail and the London Bus service; the development will also include the renewal and/or upgrade of existing stations outside central London. The route itself will link Maidenhead and Heathrow in the west with Shenfield in the north-east and Abbey Wood in the south-east.

As part of these works a point of entry (portal) is required to the tunnelled section of the route under the City to the west of the new overground station at Custom House, in Newham, London E16. It will be constructed on the current alignment of Network Rail's disused NLL and located opposite 245 Victoria Dock Road from where a ramp will be contained within a cut-and- cover box to the portal opposite 2 to 12 Bridgeland Road (western portal). From this point, Crossrail will run in a retained cut to join existing track levels immediately to the west of Custom House station (eastern portal). The portal site centres approximately on National Grid Reference (NGR) 540460 180910. The western portal site location is shown on Figure 1. The eastern half of the portal comprised the ramp up onto the surface section of the route where the impact of the development was largely limited to the archaeologically sterile historic alluvium in the upper part of the deposit sequence.

The Crossrail mitigation response to archaeology is described in the Crossrail Generic WSI (Crossrail 2009) and the detailed desk based assessment (DDBA; Crossrail 2008a), and can be summarised as follows:

- In the event that intact and important archaeological remains are identified at Crossrail worksites through this process, it may be preferable, where practicable, to preserve these where they are found (ie preservation in situ).
- However, because of the nature of major works projects such as Crossrail, experience of other similar projects suggests that preservation by record is usually the most appropriate method of dealing with archaeological finds.
- Following an extensive Environmental Impact Assessment (EIA) supporting the Crossrail Bill, and the production of site-specific DDBAs, appropriate mitigation measures were scoped and specified in detail in individual project designs (site-specific WSIs – Written Schemes of Investigation) which were prepared in accordance with the principles set out in the Generic WSI, and developed in consultation with the relevant statutory authorities.
- Archaeological information that is gained from fieldwork will be followed by analysis and publication of the results and will be transferred to an approved public receiving body.

This report details the archaeological evaluation and watching brief carried out, by C263 Museum of London Archaeology (MOLA). All fieldwork was conducted between 24/07/13 and 22/01/14. Archaeological investigations were, directed by MOLA Senior Archaeologists Isca Howell, Daniel Harrison and Portia Askew and Senior Geoarchaeologist Jason Stewart, and included the following:

Task	Principal Contractor	dates
General Watching Brief (enabling works, eg secant wall construction and construction of capping beams)	C340 Vinci Construction	Completed
Targeted Watching Brief (ground reduction within secant wall)	C340 Vinci Construction	Completed
Evaluation trenches (3 located across the surface, where lowering is required)	C340 Vinci Construction	Completed

Table 1: Fieldwork conducted between 24/07/13 to 22/01/14.

All grid coordinates in this report are cited as both the National Ordinance Survey and London Survey Grid, and all levels cited as Above Tunnel Datum (m ATD)(ATD = OD +100m).

The event code (sitecode) is **XSX11**.

2 Planning background

The overall framework within which archaeological work will be undertaken is set out in the Environmental Minimum Requirements (EMR) for Crossrail (http://www.crossrail.co.uk/railway/getting-approval/environmental-minimum-requirements-including-crossrail-construction-code#.T979khdfFXs). The requirements being progressed follow the principles of Planning Policy Guidance Note 16 (PPG16) (DoE, 1990), and its replacements Planning Policy Statement 5 (PPS5) (DCLG, 2010) and the National Policy Planning Framework (NPPF) (DCLG, 2012), on archaeology and planning. Accordingly the nominated undertaker or any contractors will be required to implement certain control measures in relation to archaeology before construction work begins.

Schedules 9, 10 and 15 of the Crossrail Bill (2005a) concern matters relating to archaeology and the built heritage and allows the dis-application by Crossrail of various planning and legislative provisions including those related to listed building status, conservation areas and scheduled ancient monuments (Schedule 9). Schedule 10 allows certain rights of entry to English Heritage given that Schedule 9 effectively dis-applied their existing rights to the Crossrail project, and Schedule 15 allows Crossrail to bypass any ecclesiastical or other existing legislation relating to burial grounds.

Notwithstanding these disapplications, it is intended that agreements setting out the detail of the works and requiring relevant consultations and approvals of detail and of mitigation arrangements will be entered into by the nominated undertaker with the relevant local planning authorities and English Heritage in relation to listed buildings and with the Department of Culture, Media and Sport (DCMS) and English Heritage in relation to Scheduled Ancient Monuments (SAMs).

3 Origin and scope of the report

This report has been commissioned from Museum of London Archaeology (MOLA) by Crossrail Ltd. The report has been prepared within the terms of the relevant standard specified by the Institute for Archaeologists (IfA 2008). It considers the significance of the fieldwork results (in local, regional or national terms) and makes appropriate recommendations for any further action, commensurate with the results.

This report will be made available from The London Archaeological Archive and Research Centre (LAARC) in due course.

4 Previous work relevant to archaeology of site

The principal previous Crossrail studies are as follows:

- Detailed Desk-Based Assessment Victoria Dock Portal, Document Number: CR-SD-PRW-X-IS-00001, 2008a.
- Crossrail, Assessment of Archaeological Impacts, Technical Report, Part 2 of 6, Central Section, Report Number 1E0318-C1E00-00001, 2005.
- Crossrail, Archaeological Programming Assessment, Report Number 1E0318-G0E00-00006 (Rev B), 2006
- Crossrail, Archaeology Generic Written Scheme of Investigation, Document Number CR-PN-LWS-EN-SY-00001, 2009.
- Crossrail, Archaeological Monitoring of Ground Investigations, Borehole Package 19, Document Number C156-CSY-T1-RGN-CR146_PT004-00004, Rev.2, 2010.
- MOLA, C263 Archaeology Late East, Central Section Project, Geoarchaeological deposit model (Revised), Victoria Dock Portal and Custom House Station Document Number: C263-OVE-T1-RGN-CRG01-50001, 2010
- Crossrail, Archaeological monitoring and deposit model of ground investigations GI Package 30: Victoria Dock Portal, Custom House Station & Connaught Tunnel Worksites Document Number C122-OVE-T1-RGN-CRG01-50001 (Rev. 2), 2011b.
- Crossrail, Victoria Dock Portal Utility Diversions GWB, Fieldwork Report (XSX11), Document Number C263-MLA-X-RGN-CRG07-S0092, 2012.

The fieldwork was carried out in accordance with:

- Crossrail, Archaeology Generic Written Scheme of Investigation, Document Number CR-PN-LWS-EN-SY-00001, 2009.
- Crossrail, Archaeology Specification for Evaluation & Mitigation (including Watching Brief), Document Number: CR-PN-LWS-EN-SP-00001, 2008.
- Crossrail, Victoria Dock Portal Written Scheme of Investigation (Rev. 8.0), Document Number: C154-HYD-T1-JLT-CR144_PT003-00001, 2011a.
- MOLA, C263 Archaeology Late East, Method Statement Archaeological evaluation and watching briefs, Document Number: C263-MLA-X-GMS-CR07-50001, 2013 [The MOLA method statement prepared in line with the Principal Contractor's method statement].

The Written Scheme of Investigation (WSI) and Method Statements will be available from the LAARC.

5 Geology and topography of site

The site is situated on the Holocene alluvial floodplain of the Thames, approximately 700m north of the modern day course of the Thames. Overlying London Clay are the Floodplain sands and gravels deposited during the Pleistocene, approximately 2,000,000 to 10,000 Before Present (BP), during which the Thames was a fast flowing braided river, formed of interconnected channels interspersed with higher sand and gravel bars. These floodplain gravels form the 'Holocene Template' on which Mesolithic activity would have taken place, the areas around channels and lakes providing resources attracting a hunter-gatherer population.

During the early Holocene, sea levels rose and lower lying areas were inundated. By the time of the Mesolithic/Neolithic transition at approximately 4000BP, the level of the Thames is likely to have risen to approximately 97m ATD. From the Later Neolithic, the braided channels gradually silted up, and combined with the rising sea levels, the conditions were conducive to peat formation. The landscape became predominantly marshland, which was crossed by the Thames as a single meandering channel.

Ground level on the site is approximately 101.5m ATD. Modern overburden was reduced to approximately 100.5m ATD under an intermittent general watching brief to the level at which 19th century remains, such as the Royal Victoria and Albert Docks might be expected. A depth of approximately 0.35m of modern make up was further excavated.

The alluvial deposit sequence across the site was characterised in a previous geoarchaeological deposit model (document no. C122-OVE-T1-RGN-CRG01-50001), utilising geotechnical data gathered from ground investigate works. Within the study area four Landscape Zones (LZs) were identified, two of which (LZ3 and LZ4) fall within footprint of the portal. The characteristics of these zones are summarised below.

LZ3 – Sand and gravel 'islands'

LZ3 comprises higher gravel 'islands' with potential for dry-land Mesolithic, early Neolithic, and possibly later Neolithic and Bronze Age activity. There is one such island within the site, located approximately at the southern end of Bridgland Road, and one to the immediate south of the eastern end of the site. There is another island c 50m west of the site. The elevation of the surface of the gravel islands is between 98m and 99m ATD. There is potentially a thickness of up to 4.0m of archaeological deposits in LZ3, extending down to 97m ATD.

LZ4 – Early Holocene channels and wetland deposits

Marginal wetland, characterised by thick peat deposits, with potential for waterlogged later prehistoric remains, such as timber trackways. This LZ is found at the westernmost 200m and easternmost 500m of the portal site although recent work suggests that this zone may extend into the area of the DLR re-alignment and portal. The most recent deposit model suggests that there is a humic layer across LZ4 at a fairly consistent level of c. 99m ATD. Previous deposit models suggested that this might be of Mesolithic date and was confined to the gravel islands but this new observation suggests that the deposit is Bronze Age. There is potentially a thickness of 3.5 to 4m of archaeological deposits in the marginal ground of LZ4, extending down to 97m ATD. Natural features such as stream channels may extend below this level although none are currently modelled.

6 Archaeological and Historic Background

This section provides a brief overview of the archaeological and historical background of the site to enable the site to be seen within its wider context. More details are available within the Detailed Desk-Based Assessment (document no. CR-SD-PRW-X-IS-00001). The Victoria Dock Portal lies within an Archaeological Priority Zone (APZ) as defined by the LB of Newham. There are no scheduled ancient monuments within the study area. Listed buildings do not fall within the remit of this report.

Prehistoric Period (c 500 000 BP to AD50)

All areas of the site have a high potential for palaeo-environmental evidence, including the survival of material such as molluscs, insects and pollen, especially within the channel sediments of LZ4. The marginal marshland of LZ4 also has potential for well-preserved waterlogged prehistoric archaeological remains such as timber trackways or jetties from the Neolithic and Bronze Ages, and other organic remains such as weirs, fish traps, revetments, causeways, peat deposits, and possibly boats.

On the islands of higher ground (LZ3) there is a moderate potential for evidence of Mesolithic and early Neolithic semi-permanent dry land activity, such as flint working areas or ephemeral structural occupation remains. A Crossrail borehole at such an island at the western end of the DLR diversions, west of the portal, contained a sandy peat layer interpreted as a possible Mesolithic soil horizon, which may offer high potential for evidence such as lithic scatters.

Roman Period (AD50 to 450)

The environment in the area of the site remained marshy open land throughout the Roman period, although there is evidence of dropping local water levels and therefore there may have been occupation in the previously marshy areas. However the gravel islands forming LZ3 lay at 98 to 99m ATD and probably remained inundated during this period.

Medieval Period (AD 450 to 1540)

The site was inundated after the Thames levels rose again during the early medieval period, and much of the landscape would have returned to marshy areas unfit for permanent settlement. The marshy low lying areas were gradually drained and reclaimed during the later medieval period.

Post–Medieval (AD1540 to 1900)

The process of land reclamation continued into the 19th century. The earliest significant development across the previously undeveloped marshland was the construction of the Eastern Counties and Thames Junction Railway, which opened in 1847. The present development lies on the route of this railway line.

The growth of the docks ensured the area altered in character significantly during the post-medieval period, with the Royal Victoria Dock constructed in 1850 to 1855. This period also saw a huge increase in the construction of housing throughout the area north of Victoria Dock Road. The Royal Victoria and Albert Docks cut (now filled in) is shown on maps of the late 19th century, and there is potential for this drainage channel at the southern edge of the portal and along the DLR diversion.

Modern (AD 1900)

Although badly damaged during bombing raids of World War II, the docks continued in use until after the war. From the 1960s onwards, the docks suffered from modern

improvements in trade, and the move of large shipping to Tilbury docks further downstream. The Royal Victoria Dock ceased to accept commercial shipping in 1980. The Eastern Counties and Thames Junction Railway became part of the North London Line in 1979, and closed on 9 December 2006 after the closure of the Stratford to North Woolwich section of the line.

7 Research objectives and aims

7.1 Objectives of the fieldwork

The overall objectives of the trial trench evaluation and targeted watching brief were to establish the nature, extent and state of preservation of any surviving archaeological remains that will be impacted upon by the development, and to define the level of watching brief required at a later stage.

The following site specific research aims can be outlined for the proposed investigations at the Victoria Dock Portal site:

- What is the development of the local landscape, topography and environment of the Thames floodplain? Can buried peat deposits be identified? If they can be dated what activity is contained within them, and how does this help to refine knowledge of prehistoric activity, occupation and settlement in the marginal wetland habitats?
- Is there any evidence for Mesolithic activity at the base of the alluvium/surface of the gravels? Is there any evidence of Mesolithic activity on the higher gravel areas of LZ3? If so, what form does this activity take, e.g. fishing, hunting, flint working etc?
- Is there any evidence for later prehistoric activity or occupation? What is the nature of activity in the marginal marshlands of LZ4? Is there evidence of prehistoric water management or subsistence fishing? What is the nature of activity on the higher grounds of LZ3? Is there evidence of semi-permanent occupation?
- Is there any evidence for Roman activity, in particular for water management, flood defences and/or fishing?
- What can be learned about the process of land reclamation and management of the area from the medieval period until the construction of the docks?
- What can be learned about the development of the docks during the recent historic period? Can details about London's growth as a 'world city' and the contribution of the Docks to this economic growth be further elucidated?
- Are there any surviving remains of the Royal Victoria and Albert Docks Cut, and the channels that fed into it? If so, what can be learned about the methods, materials and techniques employed in its construction?

The site has potential to address several general research aims identified in the regional research agenda: 'A Research Framework for London Archaeology' — Museum of London, 2002. The specific regional research themes are outlined below (page numbers are in brackets):

- understanding the significance of geomorphology, ecology, ecosystems and climate, hydrology, and vegetational and faunal development, on human lives (79);
- understanding London's hydrology, river systems and tributaries particularly the role of the Thames (as boundary, communication route, resource, ritual focus etc) in shaping London's history, and the relationships between rivers and floodplains (79);
- understanding the relationship between landscape, river and settlement, and the influences of the Thames in particular on communications and social interaction (79);

- understanding the origins of the prehistoric metalwork sequence from the Thames, and examining the links between the metalwork hoards deposited at the headwaters of river tributaries and other activities (79);
- studying the correlation between sites associated with watercourses and meander bends, so as to understand the origin of settlements (80);
- understanding the relationship between the Bronze Age wooden trackways and the settlements to which they presumably led, and what the trackways represent in terms of woodcraft and woodland management (82);
- understanding the development of London's Docklands and Waterways (82);
- examining breeding programmes and wildlife management, and marine and riverine exploitation, to understand the strategies used, their success or otherwise, and their consequences (83);
- understanding the nature and meaning of the deposition of metalwork in the Thames and at the headwaters of river tributaries (86); and
- The Mesolithic to Neolithic transition: understanding the significance of horticultural experimentation at this time, and the transition from hunter-gatherers to farmers (87).

Revised and new objectives for future fieldwork are presented in section 13.1.

8 Methodology of site-based and off-site work

8.1 General

All archaeological excavation and recording was carried out in accordance with the Crossrail Generic and Site Specific WSIs (Crossrail 2009 and 2011a), the MOLA *Method Statement* (Crossrail 2013) and the *Archaeological Site Manual* (MoL 1994). The archaeological works took place during the main C340 works contract.

Trenches 1–3 were located in the western half of the portal footprint. Modern overburden was removed by the Principal Contractor (Vinci) by machine under archaeological supervision by a MOLA Senior Archaeologist (no railway remains were observed). The overall area of the trenches was excavated to base of modern overburden. Then the underlying alluvium to a depth of approximately 1m and stair access provided. The north-facing section of each trench was cleaned manually and monolith samples taken through the deposit sequence along with 10l bulk soil samples taken at 200mm intervals.

Samples were taken by a Geo-archaeologist and Senior Archaeologist according to standard sampling procedures for an alluvial sequence:

Sample	Sampled by	Material	Processing
Column bulk At intervals down deposit profiles	Archaeologist on advice of geoarchaeologist	Freshwater and terrestrial molluscs, ostracods,	Disaggregated and wet sieved
		Plant macrofossils	Flotation or wet sieving
		Insects	Paraffin flotation
Monolith	geoarchaeologist	Sediments	Laboratory cleaning
		Pollen and Diatoms	Sub-sampled for external Specialist

Once the upper alluvial deposits were recorded and sampled, the trench was excavated mechanically, and under supervision, a further 1m depth, allowing for the south side to be stepped for safety (the northern limit was provided by the portal retaining wall). The process of recording and sampling was repeated. This overall method proceeded until gravels were encountered. There was no water ingress.

The trenches were located from chainage data provided and set out by the Principal Contractor. Similarly, levels were taken from reference points set out by the Principal Contractor.

The general watching brief took place during the enablement of the site and the targeted watching brief took place during the ground reduction within the secant wall, including the enablement of the three evaluation trenches, until the completion of the third trench when no archaeological remains had been found and no further archaeological invention was deemed to be required. This included the eastern half

of the portal where the impact was largely limited to the archaeologically sterile historic alluvium in the upper part of the deposit sequence.

9 Results and observations including stratigraphic report and quantitative report

See Figure 1 *for trench locations*

9.1 Archaeological Evaluation Trenches

9.1.1 Trench 1

See Figure 2 for section drawing

Photo 1, woody peat exposed in Trench 1, looking east

Evaluation Trench 1	
Location	Western end of portal
Dimensions	15m x 6m x 4m
LSG coordinates	90696.776E 35405.531N–90681.823E 35404.343N
OS National grid coordinates	540351.954E 180903.818N–540366.870E 180905.382N
Modern Ground Level	100.90m ATD
Modern subsurface deposits	Former railway made ground *c* 0.35m thick
Level of base of archaeological deposits observed and base of trench	A sedimentary sequence was sampled. 97.00m ATD

Natural Pleistocene observed	c. 97.00m ATD
Natural Holocene observed	100.60m ATD
Extent of modern truncation	Unknown
Archaeological remains	**Dating Evidence, Finds, and Samples**
None – a Holocene sedimentary sequence was sampled	
[1] light blue silty clay, 1.00–1.30m thick.	<1>-<3> Monoliths
Floodplain deposit with estuarine influence.	
[2] light grey silty clay, 0.20–0.25m thick.	<3> Monolith
Seasonal floodplain.	
[3] Reddish-brown clayey peat, c 0.20m thick.	<4>-<5> Monoliths and <6> Bulk
Slow tidal ingression.	
[4] reddish brown woody peat 600mm thick, 1.00–1.20m thick.	<4>, <7>-<9> Monoliths, <11>- <12> bulk and <15> timber ID
Marine regression.	
[5] grey clay, 0.47m maximum thickness.	<5>, <9>-<10>, <16>-<17> Monoliths, <13>–<14> bulk
Tidal creek formation.	
[6] grey silty sand, 0.70m maximum thickness.	<10> and <17>-<18> Monoliths
Holocene river meander/side stream.	
[7] grey sand, 0.10–0.20m thick	<18> Monolith
Holocene river meander/side stream	
[8] sand and gravel.	<17>-<18> Monoliths
Pleistocene Thames terrace	
Interpretation and summary	
Pleistocene Thames Terrace sands and gravels [8] were observed at 97.00m ATD, which were partially overlain by grey sand [7] and then sealed by grey silty sand [6]. This fining up over the terrace gravels may represent the early Holocene Thames meandering; the top of which undulated between 97.30m to 97.98m ATD. Overlying and reflecting this undulation grey clay [5] was probably the result of the formation of tidal creeks as the river levels rose and became tidal, in line with sea level rise. However a thick layer of woody peat [4] appeared to fill the low undulation indicating a marine regression. Over the woody peat was a thin band of clayey peat [3] that appeared to represent a slow transition to an actively depositing river as the floodplain became repeatedly flooded and left clays [2] and [1] with a degree of estuarine influence. A continuous horizontal yellow stain within clay [1] probably represented a short dry period that allowed the deposit to become oxidised.	

Photo 2 sampling the bottom of the sequence in Trench 1, looking south

9.1.2 Trench 2

See Figure 3 for section drawing.

Photo 3 sampling the peat in Trench 2, looking west

Evaluation Trench 2	
Location	Central section of western half of portal
Dimensions	14m x 5m x 4.2m
LSG coordinates	90731.768E 35407.161N–90745.728E 35408.219N
OS National grid coordinates	540401.805E 180907.891N–540415.731E 180909.301N
Modern Ground Level	100.90m ATD
Modern subsurface deposits	Former railway made ground c. 0.35m thick
Level of base of archaeological deposits observed and base of trench	A sedimentary sequence was sampled. 96.50m ATD
Natural Pleistocene observed Natural Holocene observed	96.70m ATD 100.60m ATD
Extent of modern truncation	Unknown
Archaeological remains	**Dating Evidence, Finds, and Samples**
None – a Holocene sedimentary sequence was sampled	
[9] light blue silty clay, 0.70m thick. Floodplain deposit with estuarine influence.	<19>-<21> Monoliths and <23>-<26> Bulk
[10] grey silty clay with humic inclusions, 0.22m maximum thickness Seasonal floodplain.	<21>-<22> Monoliths and <27>-<28> Bulk
[11] Reddish-brown clayey peat, c 0.20m–0.30m thick. Slow tidal ingression.	<21>-<22>, <30> Monoliths and <29>, <32>-<34> Bulk
[12] reddish brown woody peat 600mm thick, 1.00m thick.	<30>-<31>, <39> Monoliths and <36>-<38>, <41>-<44> Bulk
[13] grey clay, 0.25–0.35m thickness. Tidal creek formation.	<39>-<40> Monoliths and <45> Bulk
[14] grey silty sand, 0.25m thick. Holocene river meander/side stream.	<46>, <49> Monoliths and <47>-<51> Bulk
[15] sand and gravel. Pleistocene Thames terrace	<46> Monolith
Interpretation and summary	
Pleistocene Thames Terrace sands and gravels [15] were observed at c. 96.70m ATD, and were overlain by sandy gravel [14] that may represent an early Holocene	

Thames channel. Overlying the gravels was a thin layer of organic silty clay [13] that was probably the result of the formation of a tidal creek. A thick layer of woody peat [12] had accumulated over the tidal clays, suggesting woodland had colonised the former creeks. Over the woody peat, was a clayey peat [11] that appeared to represent a marginal marshland. Thin grey silty clay layer [10] probably represented a slow transition to a river floodplain deposit [9]. A continuous horizontal yellow stain within clay [9] probably represents a short dry period that allowed the deposit to become oxidised.

Photo 4 monolith <40> at base of peat layers in Trench 2

9.1.3 Evaluation Trench 3

See Figure 4 for section drawing

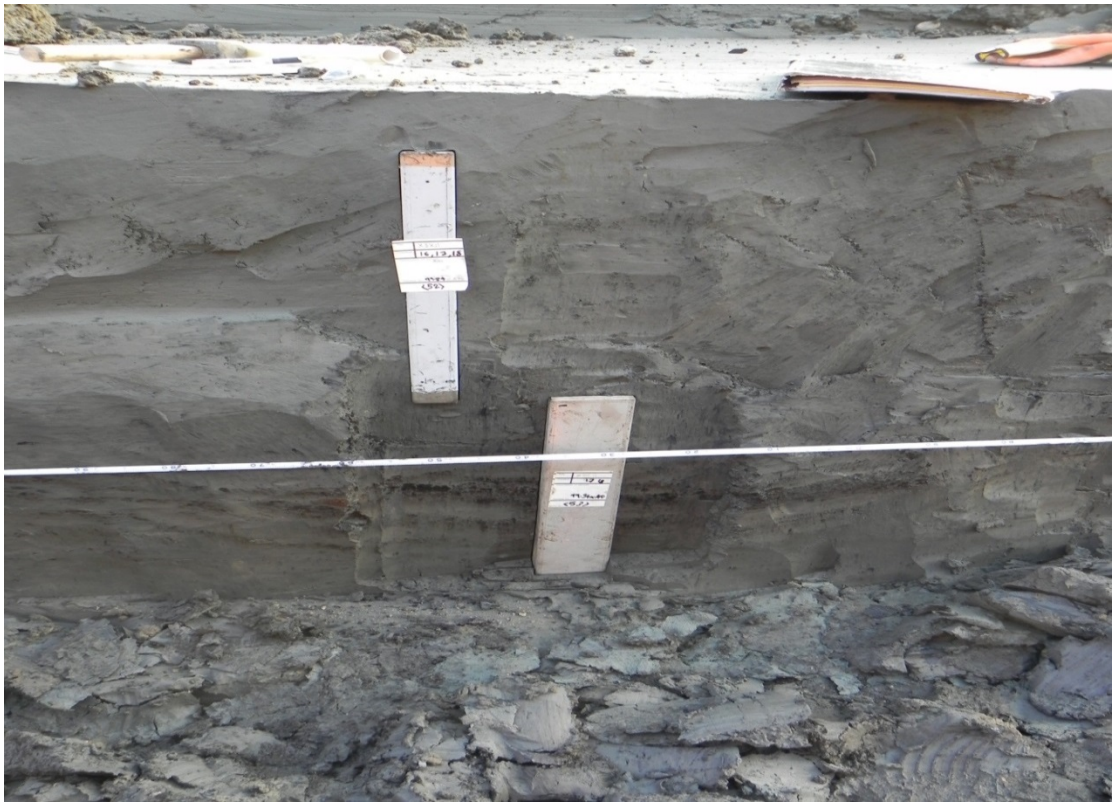

Photo 5 Trench 3: sampling the upper alluvial clay

Evaluation Trench 3	
Location	Central section of western half of portal
Dimensions	15m x 5m x 3m
LSG coordinates	90696.776E 35415.324N–90792.395E 35414.454N
OS National grid coordinates	540462.220E 180916.708N–540473.660E 180917.866N
Modern Ground Level	100.90m ATD
Modern subsurface deposits	Former railway made ground c. 0.35m thick
Level of base of archaeological deposits observed and base of trench	A sedimentary sequence was sampled. 97.69m ATD
Natural Pleistocene observed Natural Holocene observed	98.00m ATD 100.05m ATD
Extent of modern truncation	Haul route of present works had disturbed the upper deposits

Archaeological remains	**Dating Evidence, Finds, and Samples**
None – a Holocene sedimentary sequence was sampled	
[16] light blue silty clay, 0.70m thick.	<52> Monolith and <54> Bulk
Historic alluvium.	
[17] grey silty clay with humic inclusions, 0.22m maximum thickness	<52>-<53> Monoliths and <55> Bulk
Historic alluvium with pockets of eroded peat.	
[18] grey silty clay with peat and silt laminations, *c* 0.25m thick	<53> Monolith and <56> Bulk
Short-lived phases of incipient soil formation/stabilisation.	
[19] grey silty clay with frequent clasts of peat and gravel,1.00m maximum thickness.	<57>-<59> Monoliths, <56> Bulk and <62> C14 (from base)
Scouring event deposit, either fluvial or extreme weather.	
[20] black sands and fine angular gravels, 0.20m maximum thickness.	<61> Bulk
Probably part of [19], sloping to east.	
[22] clean grey silty clay,0.40m thick.	Note: exposed by further mechanical excavation test gravel at west end of trench
Tidal creek formation, scoured by action that formed the two upper deposits.	
[21] sand and gravel.	<58> Monolith
Pleistocene Thames terrace	
Interpretation and summary	
Pleistocene Thames Terrace Gravel [21] was observed at 98.00m ATD. It was overlain by tidal creek deposit [22] that appeared to have been scoured by a fluvial or extreme weather event represented by high energy deposits [19] and [20]. Above the scouring deposits, laminated deposit [18] suggested a period of episodic stabilisation where the early stages of soil formation occurred. This and the earlier scour event could be good candidates for radiocarbon dating. However probable rising sea level meant the landscape became repeatedly flooded and left clays [17] and [16] with a degree of estuarine influence.	

Photo 6 Trench 3: sampling the base of Trench 3, looking east

9.2 Watching briefs

The results of the general watching brief revealed no deposits of archaeological interest because of the shallow depth and disturbed nature of the capping beam excavations. However it did show that there were no remains of industrial archaeological interest.

The records from the targeted watching brief produced here were transcribed and abridged from site notes. All measurements were taken from the top of capping beam at 100.90m ATD, whether by tape or estimated, and their location was defined by the site chainage (see separate document). The measurements here refer to the top the deposit.

Chainage 85805(N)	
Deposits	**Levels**
Alluvial clay	100.55m ATD (top truncated by modern)
Peat	99.20m ATD
Alluvial clay	97.30m ATD
Gravel	96.95m ATD
Chainage 85805(S)	
Deposits	**Levels**
Alluvial clay	100.50m ATD (top truncated by modern)
Peat	99.30m ATD
Alluvial clay	97.90m ATD
Gravel	97.20m ATD
Chainage 85820(N)	
Deposits	**Levels**
Alluvial clay	100.55m ATD (top truncated by modern)
Peat	99.20m ATD
Alluvial clay	97.50m ATD
Sand	97.20m ATD
Gravel	97.10m ATD
Chainage 85820(S)	
Deposits	**Levels**
Alluvial clay	100.50m ATD (top truncated by modern)
Peat	99.20m ATD
Alluvial clay	97.60m ATD
Sand	97.30m ATD
Gravel	97.20m ATD
Chainage 85840(N)	
Deposits	**Levels**
Alluvial clay	100.55m ATD (top truncated by modern)
Peat	99.20m ATD
Alluvial clay	97.80m ATD
Sand	97.40m ATD
Gravel	97.00m ATD
Chainage 85840(S)	

Deposits	**Levels**
Alluvial clay	100.55m ATD (top truncated by modern)
Peat	99.50m ATD
Alluvial clay	98.00m ATD
Sand	97.60m ATD
Gravel	97.20m ATD
Chainage 85850(S)	
Deposits	**Levels**
Alluvial clay	100.55m ATD (top truncated by modern)
Peat	99.20m ATD
Alluvial clay	97.90m ATD
Natural sand	97.65m ATD
Gravel	97.45m ATD
Chainage 85870	
Deposits	**Levels (Estimated)**
Light blue alluvial clay	100.60m ATD (top truncated by modern)
Black line interface	
Reddish peat	100.20m ATD
Dark brownish peat	99.50m ATD
Dark brownish grey alluvial clay	98.80m ATD
Sharp interface	
Light grey alluvial clay with tufa	98.40m ATD
Gravel	97.90m ATD
Chainage 85880	
Deposits	**Levels (Estimated)**
Light blue alluvial clay (mottled with rootlets)	100.60m ATD (top truncated by modern)
Dark reddish brown peat (included remains of tree trunks to 0.5m diameter)	99.90m ATD
Dark brownish grey alluvial clay	99.40m ATD
Light grey alluvial clay with tufa	98.90m ATD
Sandy gravel	95.50m ATD
Chainage 85890	
Deposits	**Levels (Estimated)**
Light blue alluvial clay (thin black deposit (<100mm) near base, appears continuous	100.60m ATD
Reddish peat (included remains of tree trunks to 0.5m diameter)	100.30m ATD
Brown peat, some wood	99.40m ATD
Dark brownish grey alluvial clay	98.90m ATD
Light grey alluvial clay with tufa	98.40m ATD
Gravels with sand	97.50m ATD
Chainage 85910	

Deposits	**Levels (Estimated)**
Alluvial silt	99.80m ATD
Brown fibrous peat	99.30m ATD
Woody peat	99.50m ATD
Dark brown/black alluvial peat	98.70m ATD
Pale grey merging into black alluvium	98.30m ATD
Pale beige alluviun	97.50m ATD
Sand and gravel	97.10m ATD
Chainage 85935 - 85940	
Modern disturbance	
Chainage 85940 and 85945	
Deposits	**Levels**
Blue grey alluvial clay	99.00m ATD (top truncated by modern)
Fine dark brown peat	97.50m ATD
Chainage 85945 and 85955	
Peat did not continue to east of 85945 on north side but have continued east to south. The level of the gravels was seen rising from 97.00m ATD at chainage 85945 to 98.00m ATD at chainage 85955	

In summary, the targeted watching brief revealed an undulating gravel, sand or gravel and sand surface between 97m ATD and 98m ATD across the area of the western portal. The sands and gravels were sealed by alluvial clay that also had an undulating upper surface between 97.30m ATD and 98.40m OD, but generally higher to the east. Also the alluvial clay could been seen to the east to have a lower light grey alluvial clay with tufa flecks with an upper more organic clay; in one location having a sharp interface. Over the alluvial clay was a peat formation, almost 2m thick across much of the portal except to the east where the deposits appear more mixed and petering out before the eastern limit of the western portal. Where undisturbed the peats had a general top surface of *c* 99.40m ATD. At the top of the sequence was the light blue alluvial clay associated with the historic marshlands before the development of the area in the 19th century.

9.3 Discussion

The results of the watching briefs and trenches 1 and 2 revealed a profile of riverine deposits on the fringes of the meandering river channel or in tidal creeks. The River Terrace gravel was overlain by fine sandy or silty clay deposits that were probably deposited in the bed of a river meander or a tidal creek, as the river levels rose and it became tidal, in line with sea level rise. A thick layer of woody peat overlay the sands, indicating a marine regression and suggesting established woodland. The woody peat was in turn overlain by a thin band of clayey peat, probably a salt marsh, which appeared to represent a slow transition to an actively depositing river as the floodplain became repeatedly flooded and left clays with a degree of estuarine influence. A continuous horizontal yellow stain within the clay probably represented a short dry period that allowed the deposit to become oxidised

The sequence in trench 3, at the east end of the site, was different. The terrace gravel was overlain by a silty clay that was possibly deposited in a tidal creek. The

peat had been replaced by a deposit of silty clay with clasts of peat and clay that are interpreted as being deposited as a result of scouring caused by a fluvial or extreme weather event represented by high energy deposits. Above the scouring deposits, laminated deposit suggested a period of episodic stabilisation where the early stages of soil formation occurred. However probable rising sea level meant the landscape became repeatedly flooded and left clays with a degree of estuarine influence.

To associate the sequence found here with any formal model for marine transgression/regression and relative sea level rise within the Thames estuary, the deposition appears too simple to equate to Devoy's model (Devoy 1979). However it does match closely to a more recent model (Sidell 2003). This would propose the lower alluvial clays of the river meander or tidal creek (marine transgression) would begin accumulating in the early Holocene (*c* 10,000 bc) and continue their deposition until 4,800–3,800 cal BC when there was a slowing in the rate of relative sea level rise. This led to the formation of the peat deposits seen on the site. In the case of the wood peats this would indicate a waterlogged woodland environment, probably an alder carr, while the other peat deposits may represent marshland with vegetation dominated by reeds or sedge. This was followed by a second marine transgression that started *c* 1,500 cal BC that is still in progress at present. This transgression created the tidal floodplain environment that was on the site until the developments of the 19th century. It should be noted that Bates and Whittaker (2004) have created a more recent and refined model but Sidell's was used here as it corresponds more closely with the sequence from this site.

No remains associated with the 19th-century industrial development of the area were found.

9.4 Quantification

Sixty two sample were recovered, comprising 26 monoliths, 34 bulk samples, 1 timber ID sample and a C14 sample. There were 22 context records, 62 environmental sample records, 3 locational plans, 3 sections (on 10 permatrace sheets) and 3 trench sheets. There were also miscellaneous site notes from the watching briefs.

10 Assessment of results against original expectations and review of evaluation strategy

The draft revised GLAAS guidelines (English Heritage, 2009) require an Assessment of results against original expectations (these no longer mention the criteria for assessing national importance).

10.1 Reliability of results

The results of these investigations are consistent between exposures – the alluvial sequence is clearly defined. There are no archaeological remains.

10.2 Research aims

The original research objectives (see 7) were met as follows; information was recovered on:

- *What is the development of the local landscape, topography and environment of the Thames floodplain? Can buried peat deposits be identified? If they can be dated what activity is contained within them, and how does this help to refine knowledge of prehistoric activity, occupation and settlement in the marginal wetland habitats?*

  Three trial trenches and a targeted watching brief afforded the opportunity to record and sample the sequence above the Pleistocene Thames gravels (from 96.70m ATD). The sequence consisted of evidence for a meandering river of potentially early Holocene date, with tidal creeks forming adjacent to it. Wood peats formed over the gravels during the prehistoric period, before rising sea level in the Roman or later periods inundated the area to deposit alluvial deposits in an estuarine floodplain. Of interest is the evidence for a fluvial or extreme weather event at the eastern end of the site. The dating of the sequence depends upon further work, as would a more detailed description to refine knowledge of prehistoric activity, occupation and settlement in the marginal wetland habitats.

There were no archaeological remains of human activity. Other specific research aims were dependent upon the recovery of archaeological finds of human activity. There was therefore no evidence for activity dated to the Roman, medieval, or post-medieval periods. No evidence for Dock or early railway structures were found.

This site does not have the potential to address the general research aims identified in the regional research agenda, although it may contribute at a higher level of analysis when the findings are combined with data from other sites.

For revised and new objectives for further fieldwork based on the results see section 13.1.

11 Statement of potential archaeology

11.1 Known remains, demonstrated to be present on the site:

The site has a simple alluvial sequence, which consisted of Pleistocene Thames gravels overlain by evidence for an early Holocene river meander or tidal creek.

Woody peats formed during the Neolithic and Early Bronze Age periods, before rising sea level in the Late Bronze Age and later periods inundated the area to form the estuarine floodplain that existed until the development of the site in the 19th century. Of interest was the evidence of scouring at the eastern end of the site that represented a sudden event, such as a huge quantity of water cutting through the deposits. There was no evidence of human activity.

11.2 Potential for further remains:

- Low potential for prehistoric activity, which is likely to be limited to stray finds and isolated features.

11.3 Importance of Resources

The importance of the excavated remains has been assessed using professional judgement, informed, where applicable, by the criteria for assessing the national importance of monuments (DCMS 2010, Annex 1).

While an accurate assessment of the resource is dependent upon the processing of the samples taken, the geoarchaeological data appears to be of low to moderate importance because of the contribution to our understanding of the changing river regime, estuarine environments and how humans would have interacted with the River Thames over the period since the last Ice Age. It has the potential to be compared to other sites in the immediate area, such as Royal Docks Community School (Holder 1998) and the Urban Sustainably Centre (Halsey 2011), and with other sites in the inner Thames estuary.

12 Conclusions

The site has recovered samples from a sequence of deposits from the Pleistocene terrace gravel to the establishment of the 19th-century railway. Generally this revealed the sequence above the Pleistocene Thames gravels (from 96.70m ATD). The sequence consisted of evidence for a meandering river of potentially early Holocene date, with tidal creeks forming adjacent to it. Wood peats formed over the gravels during the prehistoric period, before rising sea level in the Roman or later periods inundated the area to deposit alluvial deposits in an estuarine floodplain. Of interest is the evidence for a fluvial or extreme weather event at the eastern end of the site.

13 Recommendations for appropriate mitigation strategy

The archive will be assessed as part of the C263 Late East post-excavation assessment and selected samples will be processed. If appropriate, significant results from VDP will be included within the CRL12 East Area Geoarchaeology Report Publication.

13.1 Revised and new objectives for further fieldwork

None

14 Publication and dissemination proposals

The results will initially be disseminated via this report; the supporting site archive of records, including digital data and by incorporation into the wider predictive deposit modelling for the Crossrail scheme. Any publication proposals will be considered by the Project Archaeologist in relation to the wider context of archaeological potential and results within the Crossrail scheme.

15 Archive deposition

The site archive containing original records will be stored temporarily with MOLA pending a future decision over the longer-term archive deposition and public access process for the wider Crossrail project.

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All archaeological investigations were supervised by the author, Daniel Harrison, Portia Askew and Jason Stewart. The MOLA Contracts Managers were David Divers and Michael Smith

18 NMR OASIS archaeological report form

OASIS ID: molas1-170875

Project details	
Project name	Crossrail Victoria Dock Portal
Short description of the project	Three trial trenches and a targeted watching brief afforded the opportunity to record and sample the sequence above the Pleistocene Thames gravels (from 3.3m below OD). The sequence consisted of evidence for a meandering river of potentially early Holocene date, with tidal creeks forming adjacent to it. Wood peats formed over the gravels during the prehistoric period, before rising sea level in the Roman or later periods inundated the area to deposit alluvial deposits in an estuarine floodplain. Of interest is the evidence for a fluvial or extreme weather event at the eastern end of the site. No artefacts or structures were recovered.
Project dates	Start: 24-07-2013 End: 22-01-2014
Previous/future work	Yes / No
Any associated project reference codes	XSX11 - Sitecode
Type of project	Field evaluation
Site status	Local Authority Designated Archaeological Area
Current Land use	Vacant Land 1 - Vacant land previously developed
Methods & techniques	"Targeted Trenches"
Development type	Rail links/railway-related infrastructure (including Channel Tunnel)
Prompt	Crossrail act
Project location	
Country	England
Site location	GREATER LONDON NEWHAM EAST HAM Crossrail Victoria Dock Portal
Postcode	E16
Study area	3500.00 Square metres
Site coordinates	TQ 40350 80900 51.509072496 0.022654661954 51 30 32 N 000 01 21 E Point

Site coordinates	TQ 40480 80910 51.5091299808 0.0245308860316 51 30 32 N 000 01 28 E Point
Height OD / Depth	Min: -3.00m Max: 2.00m
Project creators	
Name of Organisation	MOLA
Project brief originator	Crossrail
Project design originator	Crossrail
Project director/manager	Michael Smith
Project supervisor	Daniel Harrison
Project supervisor	Isca Howell
Type of sponsor/funding body	Developer
Name of sponsor/funding body	Crossrail
Project archives	
Physical Archive recipient	To be designated
Physical Archive ID	XSX11
Physical Contents	"Environmental"
Digital Archive recipient	To be designated
Digital Archive ID	XSX11
Digital Media available	"Images raster / digital photography","Survey","Text"
Paper Archive recipient	To be designated
Paper Archive ID	XSX11
Paper Contents	"Environmental"
Paper Media	"Context sheet","Notebook - Excavation',' Research',' General

available	Notes'',''Plan'',''Report'',''Section'',''Survey '',''Unpublished Text''

Project bibliography	
Publication type	Grey literature (unpublished document/manuscript)
Title	C263 ARCHAEOLOGY LATE EAST Fieldwork Report Archaeological evaluation and watching brief Victoria Dock Portal XSX11
Author	Howell, I
Date	2014
Issuer or publisher	MOLA
Place of issue or publication	London
Description	A4 report
Entered by	Isca Howell (ihowell@mola.org.uk)
Entered on	6 February 2014

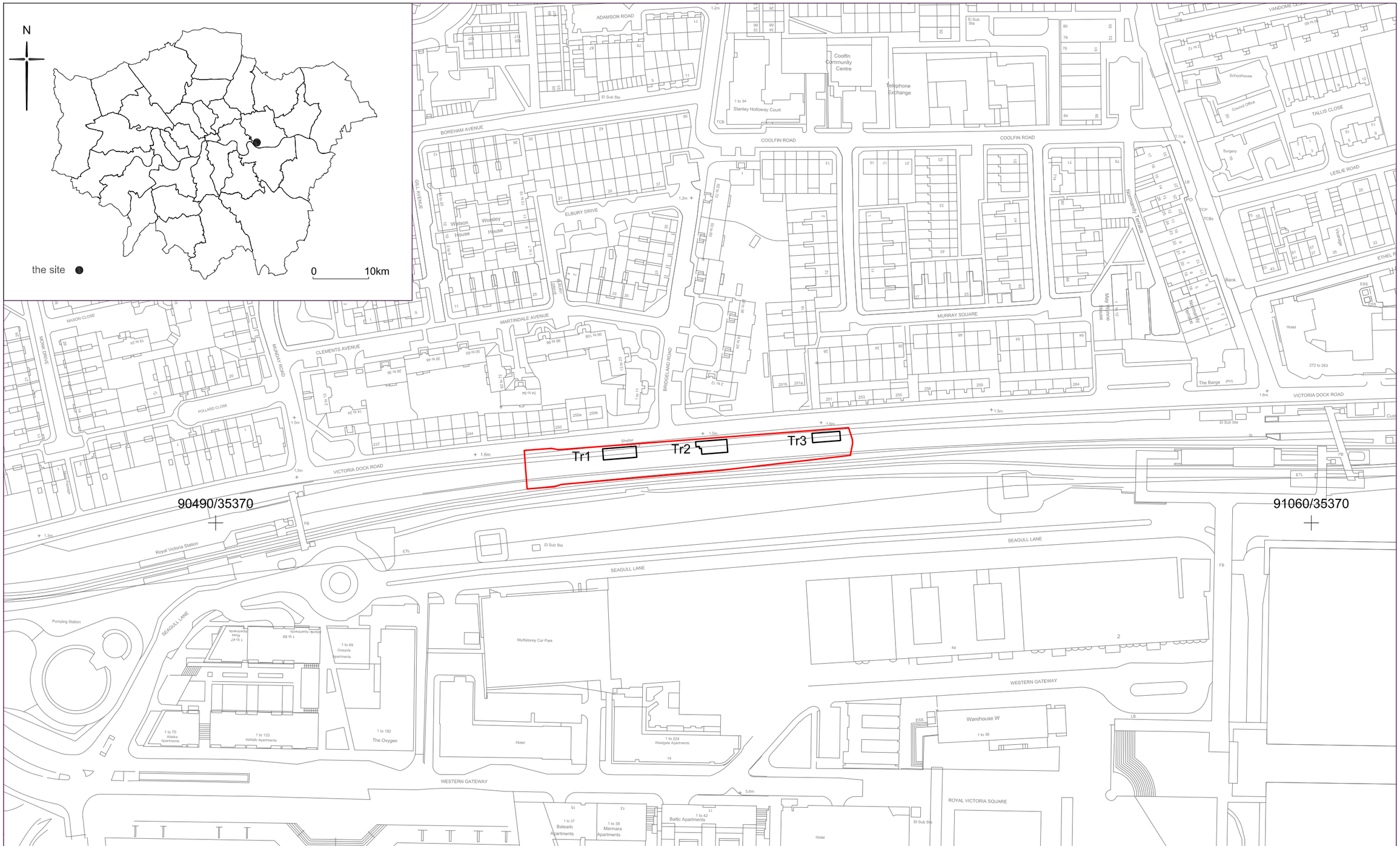

Fig 1 Site location and trench locations

Western half of portal footprint and area of watching brief

Trench edge

1:2000 @ A3

0 100m

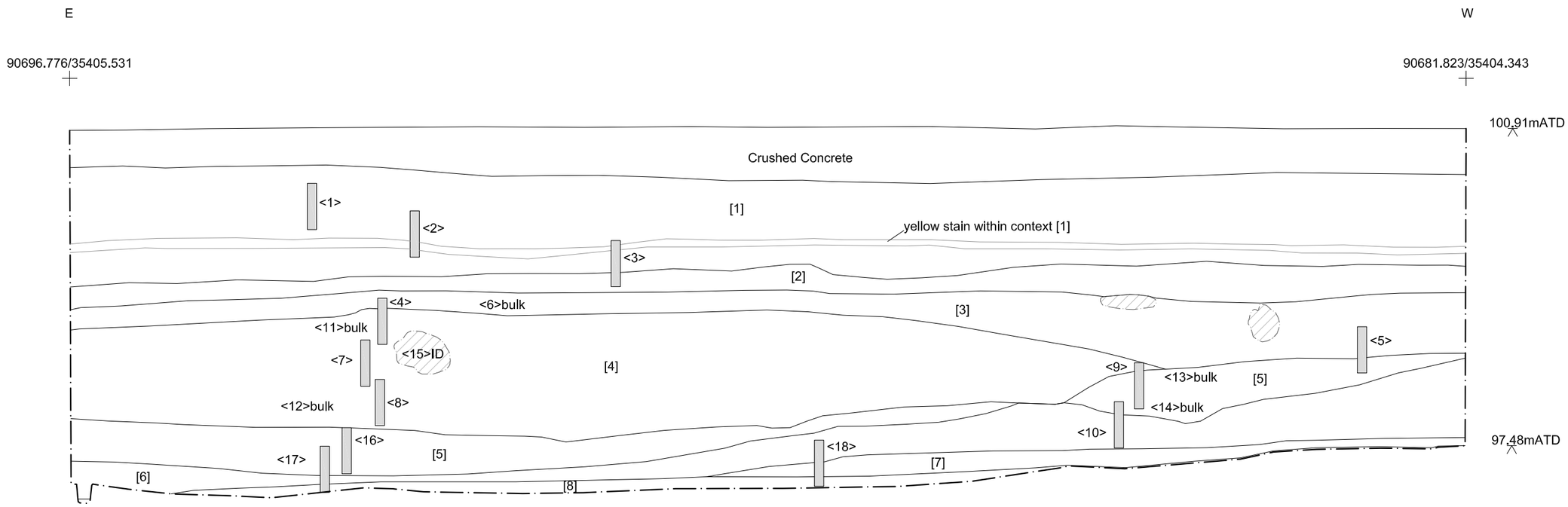

Fig 2 North facing section of Trench 1

Limit of excavation
[11] Geoarchaeological context
Timbers
<1> Sample tins and sample numbers
110.24mATD Levels in mATD

1:50 @ A3
0 2.5m

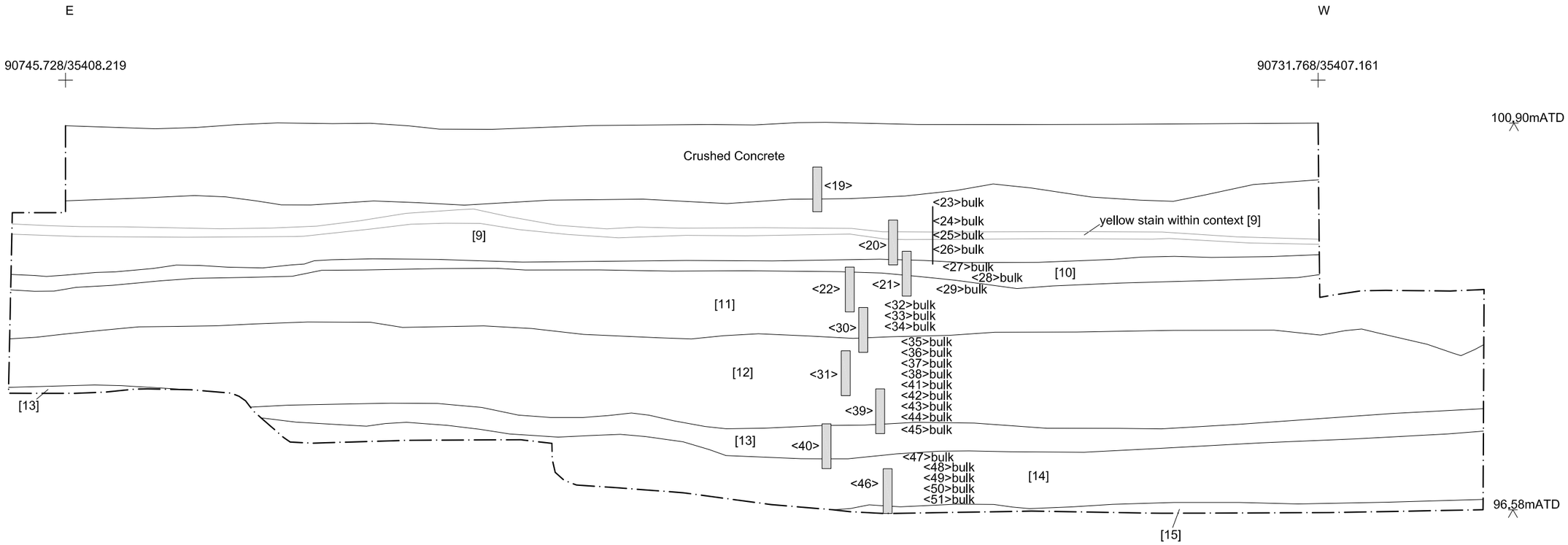

Fig 3 North facing section of Trench 2

- Limit of excavation
- [11] Geoarchaeological context
- <1> Sample tins and sample numbers
- 110.24mATD Levels in mATD

1:50 @ A3

0 2.5m

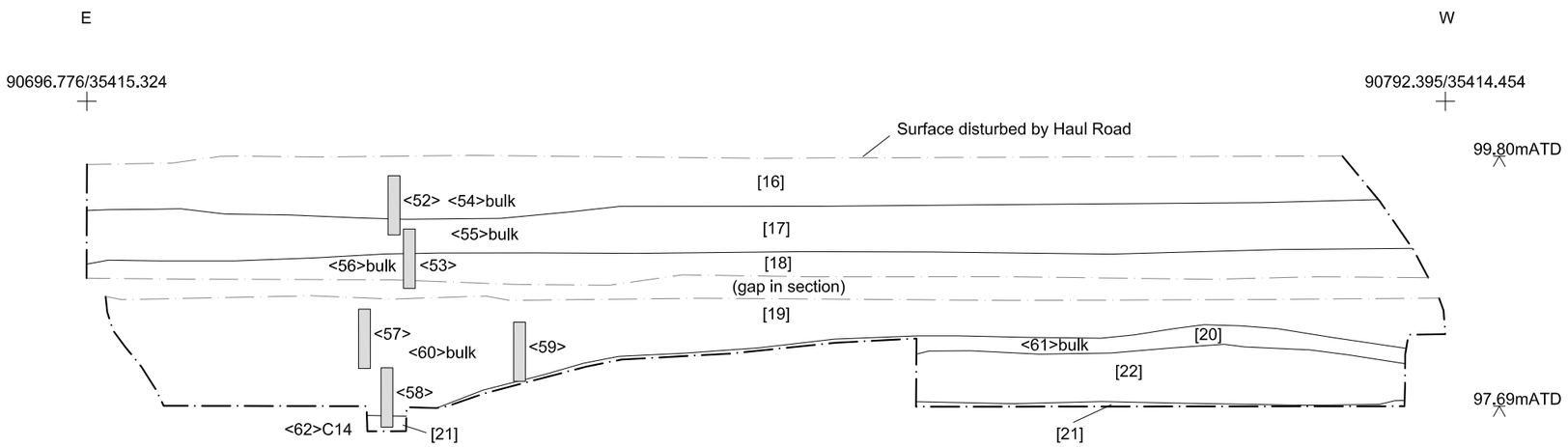

Fig 4 North facing section of Trench 3

Limit of excavation

[11] Geoarchaeological context

<1> Sample tins and sample numbers

110.24mATD Levels in mATD

1:50 @ A3

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