Foreshore-based Archaeological Evaluation report

Site 9 - Cremorne Wharf Depot (CREWD)

TTS14

Thames Tideway Tunnel

Creating a cleaner, healthier River Thames

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Foreshore-based Archaeological Evaluation Report Cremorne Wharf Depot

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Thames Tideway Tunnel

Foreshore-based Archaeological Evaluation Report Cremorne Wharf Depot (CREWD)

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Executive summary

EX 1.1 The report was commissioned from Wessex Archaeology by Atkins on behalf of Thames Tideway Tunnel Ltd. It presents the results of a foreshore-based archaeological evaluation carried out by Wessex Archaeology at Cremorne Wharf Depot, a Thames Tideway Tunnel project site. The evaluation included: geoarchaeological assessment of available geotechnical data, and the production of a foreshore deposit model.

EX 1.2 The methods used at this site were somewhat restricted by physical conditions and position of existing infrastructure: dangerously soft sediments present on the exposed intertidal area precluded the possibility of direct fieldwork on the foreshore, and the location of the extant pier/wharf in relation to the Site area obstructed the line of useful marine geophysical survey

EX 1.3 Existing geotechnical and historic borehole data was therefore used to inform the deposit modelling (**Appendix A.2**). None of this data was from the foreshore area of the Site itself, being all located on the landward side of the river wall; however in conjunction with the intertidal topographical data from bathymetric survey it has been possible to estimate the potential survival of such deposits beneath the foreshore area.

EX 1.4 Deposit modelling mapped three landscape zones across the wider Site area (**Table 4.2**). When compared with the level of the present foreshore, the results suggest that the other landscape zones of river gravels (LZ3) with overlying clays, peat and alluvium (LZ2) - which could contain *in situ* archaeological and palaeoenvironmental remains - may survive intact below LZ1 (Active beach deposits). The depth of such surviving strata, if present, is uncertain due to the absence of direct coring data from the foreshore.

EX 1.5 The evaluation concludes that the Site has a **Moderate** potential for the survival of archaeological remains, and that these are likely to be of **Medium** significance. This concurs with levels anticipated in the initial assessment of archaeological potential set out in the Environmental Statement.

EX 1.6 Bathymetric data examined as part of the condition monitoring programme shows no obvious areas of previous impact or scour are present within the Site itself to affect predicted archaeological survival within the areas of proposed impact on the foreshore.

EX 1.7 It is concluded that the proposals to refurbish the 1930s campshed and probably to enlarge it will have a direct impact upon this asset of medium significance (as derived from its group value, as possibly associated with the Grade II Lots Road Pumping Station and/or Counters Creek Sewer) and also on known post-medieval timber flood defences within the locality of the campshed. It may also have an uncertain effect on other potential archaeological remains located on the foreshore dependent on the depth of impact.

EX 1.8 It is recommended that an archaeological watching brief monitor enabling and construction works affecting the foreshore. Such a watching brief should have defined aims and be targeted to record the 1930s campshed and post-medieval known timber remains, and any other potentially surviving *in situ* archaeological remains; as well as a programme of geoarchaeological augering, and sampling should suitable deposits be present.

EX 1.9 If further work was to be undertaken, dependent on the results, there is the potential to contribute to the TTT Route-wide Heritage Themes:

Theme 1: Palaeoenvironment and prehistory. Interpretation could also take into account the results from other nearby sites (MOLAS 2002, Archaeoscape 2008 and Branch et al 2010) in order to illustrate the changing archaeology and environment of the Site through the Holocene.

Theme 4: London's water systems and public health. The 1930s campshed may be associated with the Grade II listed Lots Road Pumping Station (built 1904 but altered in the 1930s) and/or the Counters Creek Sewer and so has group value. Further documentary research may be able to determine which association is more likely.

1 Introduction

1.1 Purpose of this report

1.1.1 The purpose of this evaluation report relating to the Cremorne Wharf Depot (CWD) Site is to:

a. Describe and assess the results of a foreshore-based evaluation, which included: geoarchaeological assessment of available geotechnical data.

b. To provide information on the character, extent, quality, date, preservation and significance of archaeological deposits surviving at this Site likely to be affected by the TTT project through assessment of results of the above, and production of a foreshore deposit model.

c. To provide conclusions regarding predicted archaeological survival and significance across the Site.

d. To assess the significance of the evaluation results within the wider local and regional context and TTT Archaeological Research Framework.

e. To outline potentially suitable mitigation options.

1.1.2 The above is in accordance with the Site Specific Archaeological Written Scheme of Investigation (SSAWSI; ref. 100-RG-ENV-00000-000157).This SSAWSI was approved by the London Borough of Kensington and Chelsea's Archaeological Advisor prior to the start of work on Site.

1.1.3 This document refers to archaeological approaches and definitions set out in the Overarching Archaeological Written Scheme of Investigation (OAWSI). The OAWSI forms part of the DCO, and is appended to the Environmental Statement. It sets out the overall mitigation strategy, procedures, standards and techniques to be followed across the Thames Tideway Tunnel project (the 'project').

1.1.4 This report is produced for Thames Tideway Tunnel Ltd. and will be submitted to the London Borough of Kensington and Chelsea. The results of this programme of evaluation works will inform the need for, design of, and programme of further mitigation to be undertaken by the Employer's Archaeological Contractor (EAC) during the Main Works phase of the project.

1.1.5

1.1.6

1.1.7 A field evaluation, and the reported results of that exercise, are defined in the most recent English Heritage guidelines (GLAAS 2009 *Standards for Archaeological Work*) as:

a. An exercise to define archaeological remains rather than to totally remove them.

b. To assess the presence or absence of archaeological remains, their extent, nature quality, date and character in relation to the impact of the proposed development.

c. To provide a sufficient sample of the area of impact to enable a suitable mitigation strategy to be developed.

1.2 Site location

1.2.1 The Cremorne Wharf Depot site, hereafter called 'the Site', lies along the northern bank of the River Thames in the Royal Borough of Kensington and Chelsea (centred on National Grid Reference 526589 177125). The Site covers an area of 0.6 hectares and is bounded to the northeast by Chelsea Wharf and Cremorne Gardens, the River Thames and its foreshore lie to the immediate south-east with Chelsea Creek *c*.40m to the southwest, and Lots Road borders the Site to the northwest (**Figure 1**).

1.2.2 Present ground level on Lots Road adjacent to the Site is at 105.5m ATD (Above Tunnel Datum[i]). The level of the foreshore beside the river wall lies at 101.3m ATD, and drops down to approximately 98.5m ATD at the mean low water mark.

1.2.3 The Site lies at the northern edge of the floodplain at the confluence of Chelsea Creek, a minor tributary of the Thames which lies to the southwest of the Site, and the tidal Thames. It is situated on alluvium overlying sand and gravels. The edge of the Kempton Park river terrace which has been cut by past river systems lies immediately north-west of the Site. Full details concerning the geology and topography of the Site can be found in the ES (Vol 17, Section 7).

1.3 Evaluation aims and objectives

1.3.1 All archaeological work on the project is considered within the context of the project specific Archaeological Research Framework, included in Appendix B of the OAWSI. The Framework groups together the potential types and classes of heritage assets that might be found at TTT sites and draws on existing archaeological research frameworks and strategies for Greater London, e.g. *A Research Framework for London Archaeology* (MoLA & English Heritage, 2002) and *Greater Thames Estuary Historic Environment Research Framework* (Heppell 2010).

1.3.2 For evaluation at the Cremorne Wharf Depot Site, the following Route-wide Heritage Themes (RWHTs) within the Archaeological Research Framework are considered relevant:

a. Palaeoenvironment and prehistory

b. Settlement patterns and boundaries

c. London's water systems and public health

[i] ATD is equivalent to 100m above Ordnance Datum (aOD)

1.3.3 For the evaluation, the following questions were specified in the SSAWSI (Section 2.3):

a. *What is the topography of the foreshore at present, and how does this change over time (scour, sedimentation etc.)?*

b. *What is the depositional sequence at the Site?*

c. *Is there any evidence for the survival of deposits of palaeoenvironmental significance?*

d. *Is there any evidence of prehistoric activity/settlement on the Site?*

e. *Is there any evidence of riverfront activity in both the early and later medieval periods (such as timber revetments and fish traps)?*

f. *Does evidence survive that may be associated with the construction of extant post-medieval heritage assets (Cremorne Wharf and Lots Road Pumping Station)?*

g. *Is there evidence of post-medieval buildings such as those shown on historic maps, for example a saw mill and a row of domestic terraced housing?*

h. *Is there any evidence of Prehistoric to medieval activity on the Site?*

i. *What is the character, date, condition and significance of deposits encountered?*

j. *What is the extent archaeological survival across the Site?*

k. *What is the (seasonal) influence of tidal patterns and storm events on the archaeology of the foreshore?*

1.4 Organisation of the report

1.4.1 The report is set out into the following sections:

Section 2: Historical and archaeological background; this provides a brief summary of the potential and significance of the archaeology likely to be encountered on the Site. This is summarised from Section 7, of Vol 12 of the Environmental Statement (ES).

Section 3: Methodology; this sets out the methods used in the evaluation (as defined in the SSAWSI), and quantifies the physical and drawn archive (i.e. numbers of plans and sections and boxes of finds).

Section 4: Results; this describes the results of the evaluation, including the deposit sequence recorded in available geotechnical core data, and presents the results as a foreshore deposit model. This section also assesses the reliability of the results, noting any constraints encountered.

Section 5: Archaeological potential and significance; this responds to each of the Site specific questions identified in the aims and objectives of the evaluation, and reviews whether the results contribute to the project wide research themes. This section also discusses the predicted archaeological survival across the Site, and how the results refine the

understanding of the significance of the archaeology as previously defined in the ES.

Section 6: Predicted impacts and recommendations; this assesses the impact of the development on the archaeological resource and provides recommendations as to an appropriate mitigation strategy.

2 Historical and archaeological background

2.1 Introduction

2.1.1 A desk-based assessment for this Site and its defined study area is reported within Volume 12 (Section 7, and detailed in Appendix E) of the Environmental Statement (ES). For detailed information on background and potential the ES should be referred to, however the relevant information is briefly summarised below.

2.1.2 Known historic environment assets (HEA references from the ES) are discussed where relevant in the text below; those indicated in bold (**HEA**) are shown on **Figure 1.**

2.2 Previous archaeological work

2.2.1 In the 1990s the Thames Archaeological Survey (TAS) carried out a survey of the foreshore within the Site which identified post-medieval riverfront flood defences (**HEA 1A**) and a post-medieval timber structure of vertical posts below the existing Cremorne Pier (**HEA 16**). Both these were noted as present during a Site visit made in order to inform the ES. In addition, the Site visit identified an arched sewer outlet with brick channel (**HEA 1C**), exiting from the river wall directly underneath Cremorne Pier (**HEA 31**).

2.2.2 Geoarchaeological investigation was undertaken at Lots Road Power Station in 2008 (**HEA 15**) to the south-west of the Site. Seven boreholes revealed alluvium formed by slow moving water, and two thin layers of peat. One of the peat layers at 100.3m ATD was dated between the Late Bronze Age and Middle Iron Age. The second peat layer dated to the Saxon (early medieval) period.

2.2.3 Another geoarchaeological investigation was carried out in 2002 at Lots Road Power Station, approximately 100m south/south-west of the Site. The floodplain gravel was noted at *c*. 100.0m ATD (5-6m bgl), with peat/humic mud at between 99.0 and 101.0m ATD (5-7m bgl). The surface of the overlying alluvium was noted at 102.0m ATD (HEA 10; ES Vol 12; Appendix E).The peat identified overlying the floodplain gravel was radiocarbon dated to 750–240 BC in one borehole and 360 BC–AD 80 in another borehole suggesting that the earlier peat represents the initial transition from the previously dryland in the earlier prehistoric period (that existed across most of the investigated area)) to a wetland environment. It was also concluded that the peat progressively developed at higher elevations as river levels rose later in the Iron Age into the Roman period i.e. is ‘time transgressive’ (MOLA 2002, p20).The overlying alluvium is indicative of a wetland environment that characterised the Site during much of the historic period (MOLA 2002, p27).

2.2.4 Previous boreholes on the same investigation adjacent to the present river recorded peat at levels of 98m ATD and this lower-lying peat may correspond to the peat associated with timber, thought to be the remains

of a floodplain forest, observed at similar levels on the present foreshore at low tide and dated to the Neolithic (MOLAS 2008, 20).

2.3 Archaeological and historical context

Prehistoric (500,000 BC – 43 AD)

2.3.1 During the early prehistoric period an irregular and undulating gravel surface (a remnant of topography from the Late Glacial river system) existed across the Site. Redeposited Palaeolithic flint tools were found on the foreshore just to the east of the Site (**HEA 29**). Dry land existed on outcrops of higher gravel, such as in the southwestern part of the Site, with a marshy wetland developing in the lower areas, such as the north-eastern part of the Site. The marshland beside the confluence of Chelsea/Counters Creek and the tidal Thames could have been an attractive resource for hunting and fishing in Mesolithic/Neolithic times with dryland nearby for potential occupation. A layer of peat was observed on the present foreshore *c.*50m north-east of the Site and is likely of Neolithic date (HEA 8; ES Vol 12 Appendix E); this has the potential to preserve organic remains. For example, a Neolithic wooden club, and Neolithic and Bronze Age lithics and human remains were recovered during an archaeological foreshore survey 200m downstream of the ES study area. An archaeological evaluation undertaken c.170m to the west of the Site, recorded redeposited worked flint debitage of probable Mesolithic date indicative of some activity of this period within the vicinity (HEA 11, ES Vol 12 Appendix E).

2.3.2 As water levels rose in the later prehistoric period, due to a rise in global sea level, the Site would have become increasingly marshy. A nearby geoarchaeological investigation provided evidence of this in the form of peat horizons dating from the Iron Age into the early Roman period (para.2.2.3 above).

Romano-British (AD 43 – 410)

2.3.3 In the Roman period, the entire Site would have been seasonally flooded, wet meadowland or marsh, unsuitable for settlement but possibly exploited for a range of resources. The Site lay at some distance from known Roman settlement or roads and the only known evidence of activity is Roman pottery, likely to be residual, found from beside Chelsea Creek, *c.*110m to the southwest of the Site (**HEA 4**).

Early medieval (AD 410 – 1066)

2.3.4 Throughout the medieval period (AD 410–1485), the Site lay in marshland, prone to flooding. This is evident from the radiocarbon dating of peat formation to AD 420610during an extended period of tidal alluvial sedimentation discovered west of the Site at Lots Road Power Station (**HEA 15**; Archaeoscape 2008, p37). The Site is located 600m south-west of the mid and late Saxon settlement in the vicinity of Chelsea Old Church, which may have been a significant royal estate. There is no known evidence for Saxon activity closer to the Site; however two mid-Saxon fish

traps have been recorded on the foreshore 200m downstream of the ES study area.

Medieval (AD 1066 – 1485)

2.3.5 Chelsea village was well established by later medieval period. During this time, the Site was located on the foreshore, where activities such as fishing may have been undertaken. The adjacent open fields would have been farmland, as known from documentary sources recording meadows (**HEA 6** and **9**). A single chance find of a later medieval ring is known to have been recovered from Chelsea Creek *c.*50m south-west of the Site (**HEA 6**).

Post-medieval (AD 1485 – present)

2.3.6 It is likely that the area of the Site was drained and reclaimed in the post-medieval period, and brought under cultivation with the expanse of market gardening known in the Chelsea area between the 17th and 19th centuries. The Site remained undeveloped until the mid-19th century, when a row of terraced houses was built along Lots Road. A saw mill and an associated large yard were also constructed on the Site. Post-medieval timber revetments and structures are known on the foreshore of the Site (**HEA 1A** and **16**; para 2.2.1 above)

2.3.7 The industrialisation of the riverfront increased by the late 19th century, the Site was now known as Cremorne Wharf, with warehouses, industrial buildings, a travelling crane and Cremorne Pier extending out across the foreshore for moving goods by river (**HEA 31**). The river wall (**HEA 30**) is likely to date from this time. The existing Grade II listed Lots Road Pumping Station (**HEA 1B**) was built in 1904 and altered in the 1930s in the north-western part of the Site, following demolition of the houses fronting Lots Road. The Counters Creek sewer outlet beneath the pier is either contemporary with the Pumping Station or predates it (**HEA 1C**). In the 1930s, a campshed was constructed on the foreshore in front of the river wall (**HEA 1D**), although this was not visible on the ES Site visit and was likely to have been obscured beneath channel silt (ES Vol 1, para 7.4.19). In the 20th century the land part of the Site was occupied by the Cremorne Works and subsequently used as council refuse tip and depot.

2.4 Summary of potential from ES

2.4.1 A summary of the Site's archaeology potential and significance by period, in relation to buried remains, is given in **Table 2.1**; as identified in the ES (Vol 12 Table 7.10.1).

Table 2.1: Archaeological potential and significance by period

Overall Site potential: **moderate potential** for prehistoric land surfaces within alluvium on landward side of river wall. Overall Site significance is **medium** (OAWSI, para 8.4.5)
High potential for palaeoenvironmental remains (**Low** significance)
Moderate potential for redeposited artefacts of prehistoric date (**Low** significance)
Moderate potential for prehistoric activity or settlement (**High** significance)
Low potential for isolated Roman artefacts (**Low** asset significance)
Low potential for early and later medieval features (associated with the use of the river such as fishtraps, timber revetments) (**Medium to High** significance)
High potential for post-medieval domestic remains, footings of 19th century buildings (**Low** significance)
High potential for post-medieval industrial remains with group value (**Medium** significance)
Buried/obscured remains of a mid-20th century campshed with group value (**Medium** asset significance)

3 Evaluation Methodology

3.1 Introduction

3.1.1 The methods applied to the evaluation of the Site included:

a. Condition Monitoring (to track changes in the topography of the foreshore and riverbed of the Site over time, by comparison of data from successive bathymetry surveys); and
b. Deposit Modelling.

3.1.2 Due to the relatively small area of foreshore impact, the dangerous soft sediments present on the exposed intertidal area, and the presence of the extant pier/wharf, no fieldwork or marine geophysical survey was practical for the Site. For those same reasons, no vibrocores were previously obtained for the TTT project. Therefore, only geotechnical data and historic borehole data (**Appendix A.2**) was available to inform the deposit modelling.

3.1.3 The Condition Monitoring programme is undertaken using third party bathymetry data, collected by Port of London Authority (PLA) for Wessex Archaeology, and is reported on separately at quarterly intervals. The first Condition Monitoring report has been issued (Wessex Archaeology 2014; TTT document reference forthcoming). More detailed methodologies for the other techniques are set out below.

3.1.4 All archaeological investigations were carried out in accordance with the SSAWSI (ref. 100-RG-ENV-00000-000157) for the evaluation works at this Site. All recording was carried out to the format and standards detailed with the *Archaeological Site Manual* (MOLAS 1994).

3.1.5 The site code was allocated by the Museum of London Archaeological Archive and Research Centre (LAARC) is referenced: TTS14. This site code was used on all records, and any retained artefacts and samples that form part of the site archive.

Data and samples acquired prior to Evaluation

3.1.6 The scope of evaluation works as set out in the SSAWSI required the utilisation of data and samples acquired prior to the start of the project. In addition to large amount of geotechnical borehole data used in deposit modelling (**Appendix A.2**) this also includes geophysical data.

Non-archaeological marine geophysical data

3.1.7 TTT has gathered non-archaeological marine geophysical data over the course of the pre-consent phase of the project for engineering purposes, to inform understanding of ground conditions on the Site.

3.1.8 The data acquired prior to September 2013 comprises processed sidescan sonar and multibeam bathymetry datasets from multiple surveys.

This data has been subjected to gap analysis in order to assess its suitability for use in identifying any unusual seabed structures that could be shipwrecks or other anthropogenic debris (document ref. 1000-ENV-ZZZZZ-SGR-YE-RG-100001-P01).

3.1.9 The results of this gap analysis report show that the data were unsuitable for use in archaeological interpretation. Although not directly applicable to defining archaeological potential, this result has helped develop the methodology for this evaluation (SSAWSI; 100-RG-ENV-00000-000157)

3.2 Deposit model construction

3.2.1 In order to create the deposit model, available data points from the Site and vicinity were entered into a digital database (Rockworks 15). For this Site, no vibrocores were previously obtained for the TTT project; therefore the deposit model uses available borehole data (**Appendix A.2**) and 'pseudopoints' based upon bathymetric data (**Appendix A.2**).

3.2.2 At this Site, a total of 15 deposit records were entered. The distribution of the data points most relevant to this analysis is illustrated in **Figure 2**.

3.2.3 During modelling, each identified lithological unit (gravel, sand, silt etc) is given a unique colour and pattern allowing cross correlation of the different sediment and soil types across the Site. By examining the relationship of the lithological units (both horizontally and vertically) correlations can be made between soils and sediments, and associations grouped together on a site-wide basis. The grouping of these deposits is based on the lithological descriptions, which define distinct depositional environments.

3.2.4 Thus, where suitable contexts are present, a sequence of stratigraphic units[ii], representing certain depositional environments, and/or landforms can be reconstructed both laterally and through time for the Site. These can then be displayed in the form of Digital Elevation Models (DEMs) and thickness plots.

3.2.5 Geoarchaeological interpretation of the modelling results can be used to create a series of Landscape Zones (LZs), made up of characteristic deposit sequences, containing one or more stratigraphic units, and defining landforms and depositional environments.

3.2.6 In practice, the sequences recorded on most of the foreshore sites are limited in variability and depositional environments represented, and the number of stratigraphic units are therefore similarly limited.

3.2.7 The system of landscape zones and stratigraphic units has been retained nonetheless, in order to allow uniform approach between the Sites, and easier correlation with deposit modelling from evaluation of the land-based sites.

[ii] A geoarchaeological term defining a layer deposited under certain environmental conditions. For example, alluvial clays/silts deposited in intertidal salt marsh, or peats forming in wetland alder carr.

3.2.8 Due to the limited nature of the data at this Site, which contained no deposit records from the foreshore, all Digital Elevation Models (DEMs), thickness plots and schematic cross sections were focused on the landward side of the river wall.

3.3 Quantification of the archive

3.3.1 No boxes of finds were recovered from the Site. No environmental samples were taken.

3.3.2 The Site records can be found under the site code TTS14 at the offices of Wessex Archaeology, but will be deposited in the Museum of London Archaeological Archive and Research centre (LAARC) in due course.

4 Results

4.1 Geoarchaeological deposit model

Introduction

4.1.1 The following sections present sub-surface deposit models for the Site. These were constructed by extrapolating stratigraphic deposits identified within the data across the whole of the Site, including outlying points (**Appendix A.2**).

4.1.2 No vibrocores were previously retrieved by the TTT project from the foreshore of the Site and so the deposit model uses available borehole data focused on the landward side of the river wall (**Appendix A.2**).

Stratigraphic Units

4.1.3 Although not all recorded directly within the Site, six major stratigraphic units are known to exist in the area of the Site. These units are summarised in **Table2.2** below, and listed in stratigraphic order from the oldest to the most recent.

Table 4.1: Summary of stratigraphic units

Stratigraphic unit	Lithology/Description	Chronology	Environment of deposition
1. Lambeth Group	Clay, silt and sand.	Palaeogene, *c*. 56 to 66 million years ago	Swamps, estuaries and deltas
2. London Clay	Clay, silt and sand.	Palaeogene; 34 to 56 million years ago	Deep sea marine deposits
3. River gravel deposit, e.g. Kempton Park Gravel Formation	Coarse grained sands and gravels	Late Devensian, c 18–15,000 BP or Holocene	High energy river regime (e.g. cold climate braided if Pleistocene)
4. Organic deposits	Organic silts, clays and peats	Holocene	Temperate climate Stabilisation/channel edge deposits
5. Alluvium	Minerogenic silts, sands and clays	Holocene	Temperate climate Channel/Channel edge/waterlogged environment
6. Active beach deposits	Sands, sandy gravels and soft muds	Broadly Saxon to Modern, mostly post medieval	Tidal foreshore environment

Results

4.1.4 Schematic cross sections have been produced in the form of two transects (**Figures 2**-**3**). A Digital Elevation Models (DEM) has been generated to display the upper surface of the river gravels (**Figure 4**) as well as a thickness plot to show the depth of organic deposits (**Figure 5**). The transect results are detailed in **Appendix A.1** and summarised below with the DEM and thickness plot results.

4.1.5 The results, although limited in this case, are also displayed as a plan-view of landscape zones (LZs) in **Figure 2** and summarised below.

River gravels DEM (Figure 4)

4.1.6 The digital elevation model (DEM) was constructed using all 15 deposit records, though all the deposit records were terrestrial so the model focuses on the landward side of the Site. From the resulting DEM the height of the sands and gravels of the river gravels indicate that across the Site the surface varied in height from 98.5m ATD in the west to 100.5m ATD in the north-west. The surface of the deposit sloped down from the north-west towards the south-east before rising again towards the river wall forming a south-west to north-east aligned depression that is possibly the course of a Pleistocene channel.

Organic deposit thickness plot (Figure 5)

4.1.7 As with the river gravels DEM, all 15 terrestrial deposit records used to model the thickness of the organic deposits were located on the landward side of the Site. The deposits varied from 3.2m thick in the north of the Site, to less than 0.2m in the south-east. The thicker sequences of organic clays and peats were broadly aligned with the south-west to north-east depression within the underlying river gravels, suggesting that the organic clays and peat had formed in the abandoned channel referred to above.

Summary

4.1.8 From the available deposit records (all of which were terrestrial, with no foreshore records present), Transects A and B indicate that the London Clay is overlain by river gravels, up to a maximum of 4.42m deep at the northwest end of Transect B (**Figure 3**). The river gravels are not present in the middle of the Site along Transect B, but return to a thickness of 1.52m near the river wall.

4.1.9 The river gravels overlying the London Clay in Transect A were thinner at up to 0.9m at the north-west end, again disappearing in the middle of the Site before returning to 0.6m in thickness adjacent to the river wall. The transects and the river gravels DEM (**Figure 4**) show a depression within the river gravels running south-west to north-east across the Site. The organic deposits thickness plot (**Figure 5**) indicates that the organic deposits are at their thickest (up to 4.34m deep, midway along Transect B) in the locality of the depression in the underlying river gravels and so is indicative of an earlier channel or course of the river abandoned due to channel migration, that has subsequently infilled with low energy organic silts and clays.

4.1.10 These low energy organic silts and clays deposits were then overlain by up to 4.5m of made ground with the construction of the river wall.

4.1.11 Although no deposit records were available for the Site's foreshore at the, the river gravel DEM (**Figure 4**), organic thickness model (**Figure 5**) and modern foreshore profile allowed for the prediction of the possible extent of Landscape zones (LZs) under the surface of the modern foreshore within the Site (**Figure 2**).

Landscape Zones (Figure 2)

4.1.12 Three landscape zones, which in places were overlain by up to 3.5m of made ground, were identified across the Site on the landward side of the river wall; the possible extent of these has been extrapolated onto the foreshore of the Site in light of the deposit modelling results (**Figure 2**). The LZs are summarised and described below.

4.1.13 Significantly, the actual extent of Landscape Zones that may survive below the active beach deposits on the foreshore cannot be ascertained because no cores were taken from the intertidal foreshore of the Site. However modelling of the deposits has shown that LZ2 and LZ3 are likely to extend from terrestrial strata out under LZ1 onto the foreshore (**Figure 3**).

Table 4.2: Summary of Landscape Zones

Landscape Zone	Description	Archaeological potential/ significance[iii]	Palaeoenvironmental potential/significance [iv]
LZ1	Area of foreshore characterised by probable presence of active beach deposits and low-energy alluvial mud below surface of modern foreshore, but not confirmed during evaluation. Underneath LZ1 deposit modelling has suggested the lateral extension of LZ2 and LZ3 from the landward-side of river wall (see below for potential and significance), although not confirmed during evaluation.	Low/ negligible potential for intact Holocene terrestrial strata in LZ1. High potential for evidence of post-medieval –modern river-associated remains including known timber flood defences and campshed (medium significance). Low potential for remains (predominantly redeposited artefacts) of other periods of low significance (except if prehistoric of medium significance).	Moderate potential for remains of low significance within low-energy tidal muds
LZ2	Area characterised by periods of stabilisation promoting peat	Moderate potential for intact Holocene terrestrial strata.	High potential for remains of low significance within organic clays and peats

[iii] The significance level is determined using the criteria in Section 7 of ES Vol 12 Methodology
[iv] Ibid.

Landscape Zone	Description	Archaeological potential/ significance[iii]	Palaeoenvironmental potential/significance [iv]
	formation together with periods of marine inundation Organic silts, clays, peats and alluvium	Moderate potential for prehistoric activity or settlement (High significance): • prehistoric (Mesolithic- Early Iron Age) occupation/settlement likely on higher ground inland where soils could have developed, followed by wetland Iron Age and later activity following river level rise; and • prehistoric (Mesolithic-Early Iron Age) wetland activity on lower eastern margins (?present foreshore) including organic preservation e.g. timber trackways. Low potential for early and later medieval remains (associated with the use of the river such as fish traps, timber revetments).	
LZ3	Fluvial deposition by braided river channels within a cold/temperate climate forming river gravels of fluvial silts, sands and gravel	Moderate potential for Late Devensian fluvial gravel strata of low significance to survive. Negligible potential to contain *in situ* Late Upper Palaeolithic artefacts but low potential for redeposited artefacts of this period.	Negligible palaeoenvironmental potential

LZ1

4.1.14 LZ1 is mapped over the entire area of the foreshore, eastwards of the river wall (**Figure 2**).

LZ2

4.1.15 LZ2 was mapped in the north-west end of Transect A and in Transect B from TQ27NE130 where it was at its thickest (up to 4.34m) to where it thinned out towards TQ27NE131 adjacent to the river wall. Although the

records were sparse the results from the modelling (**Figure 5**) suggests the thickest section of LZ2 forms a band filling a depression aligned south-west to north-east, likely representing the line of a former channel. No records from the foreshore were available, but the modelling suggests that LZ2 may extend out from the landward side of the river wall to part way under the foreshore.

LZ3

4.1.16 LZ3 was mapped in the north-west of the Site and in the area of the Site adjacent to the river wall (**Figure 4**). The lack of LZ3 type deposits across the centre of the Site from the modelling suggests the line of a channel, possibly an earlier course of the river abandoned due to channel migration which then allowed for the development of LZ2 type deposits. No records from the foreshore were available, but the modelling suggests that LZ3 type deposits may extend out from the landward side of the river wall and exist under the foreshore of the Site.

4.2 Overall reliability of the results

4.2.1 The Deposit modelling was based on available borehole data that was mostly derived from historical BGS logs, and as such the interpretations and descriptions were significantly less rigorous in some respects compared to more recent data – for example, in some cases gravels are often referred to only with the single word ‘ballast’.

4.2.2 The lack of deposit records located on the foreshore also significantly affects the reliability of any deposit modelling in that area of the Site.

5 Archaeological potential and significance

5.1 Review of aims and objectives

Site specific questions

5.1.1 Drawing on the results presented in Section 1, the following is concluded in relation to each of the objectives detailed in para 1.1.5:

a. What is the topography of the foreshore at present, and how does this change over time (scour, sedimentation etc.)?

5.1.2 Bathymetric data has been assessed for condition monitoring of the foreshore (the subject of a separate report; Wessex Archaeology 2014). The surface difference results indicate very little sediment movement has occurred, with most of the assessed data showing net erosion/accumulation of +/-0.15m or less. Some sediment movement, mainly accumulation up to +0.6m, has occurred along the central channel of the river. Up to +0.25m accumulation is present along the deepest edge of the Site (Wessex Archaeology 2014, 3).

b. What is the depositional sequence at the Site?

5.1.3 The deposit sequence on the foreshore of the Site, eastwards of the river wall, is not certain because no cores from this area were available for assessment. The terrestrial deposit records from the landward side of the river wall indicate up to 3.6m of made ground overlie up to 4.6m of organic clays, peat and alluvium overlying river gravels above London Clay. A comparison of the modern foreshore profile with the plotted terrestrial deposits in Transects A and B (**Figure 3**) suggests that at least at the upper western end of the foreshore a similar sequence may still exist minus the made ground. However, the depths of river gravels and overlying clays, peat and alluvium, the latter of which could contain archaeological deposits and artefacts, cannot be gauged without data from the foreshore itself.

c. Is there any evidence for the survival of deposits of palaeoenvironmental significance?

5.1.4 No cores were retrieved during this evaluation from the foreshore and therefore no direct evidence can be added to the high potential outlined in the ES. However, examination of both historical terrestrial deposit records from the Site and of unpublished reports from geoarchaeological investigations within the vicinity appear to suggest that there is a high potential for deposits of palaeoenvironmental significance to survive under recent fluvial beach deposits on the foreshore. Previous work undertaken to the south-west of the Site between Chelsea Creek and Thames Avenue identified an Iron Age organic peat deposit of between 0.5m and 1m thick (surface height of peat at *c.*100m-101.0m ATD) overlying the floodplain gravel and sand in the east of the investigated area. Such peat is likely to preserve good assemblages of pollen, plant macro remains and insects

(MOLAS 2002, 20-21). Previous boreholes on the same site adjacent to the present river recorded peat at levels of 98m ATD and is likely of Neolithic date (MOLAS 2008, 20).If these earlier peats were present on the foreshore of the Site, these too would have a similar high palaeoenvironmental potential.

d. Is there any evidence of prehistoric activity/settlement on the Site?

5.1.5 There is no further evidence to supplement that already known from the ES as no fieldwork was undertaken as part of this foreshore evaluation; therefore there remains moderate potential for prehistoric settlement or activity.

5.1.6 Any potential dryland settlement/occupation of early prehistoric date (Mesolithic to Early Iron Age) is anticipated on soils that may have formed over the river gravels on the higher ground in the far north-east and south-east corners of the landward part of the Site (as shown in **Figure 4**).

5.1.7 The deposit modelling suggests that the river gravels and the overlying alluvium/peat could laterally extend onto the foreshore of the Site (**Figure 3**). The foreshore may have been a marginal wetland in the Mesolithic and Neolithic periods, but as river levels rose during the prehistoric period, lower lying parts of the Site would have been progressively inundated. Prehistoric activity in marginal wetland environment could be represented in the form of timber trackways and other artefacts as well as plant remains preserved in the organic deposits.

e. Is there any evidence of riverfront activity in both the early and later medieval periods (such as timber revetments and fishtraps)?

5.1.8 No further evidence was gained to add to assets known from the ES as no fieldwork was undertaken as part of the foreshore evaluation. It is likely that the Site was occupied by marshland during this period, as attested by the Saxon radiocarbon dates of peat found at Lots Rd power station to the south-west (Archaeoscape 2008**; HEA 15**, **Figure 1**) and the documentary evidence of later medieval meadows (**HEA 6** and **9**; **Figure 1**) and therefore settlement is not anticipated, however there is the low potential for river-associated remains such as timber revetments and fish traps to exist within alluvial silts/peats on the Site.

f. Does evidence survive that may be associated with the construction of extant post-medieval heritage assets (Cremorne Wharf and Lots Road Pumping Station)?

5.1.9 No evidence has been revealed because no fieldwork was undertaken as part of this foreshore evaluation. However, known post-medieval flood defences and an unclassified timber structure and the 1930s campshed beneath the present pier identified on previous foreshore surveys (**HEA 1a**, **16**, and **1D** respectively; **Figure 1**) could relate to these assets.

g. Is there evidence of post-medieval buildings such as those shown on historic maps, for example a saw mill and a row of domestic terraced housing?

5.1.10 This foreshore evaluation has not yielded any evidence to inform this site specific question; such remains could be expected on the landward part of the Site.

h. Is there any evidence of Prehistoric to medieval activity on the Site?

5.1.11 No further dated evidence has been encountered during this evaluation and therefore the potential remains as defined in the ES. However, importantly the deposit modelling has suggested that there is lateral continuity of strata from the landward side of the river wall in the form of clays, peat and alluvium which could contain archaeological remains of these periods overlying river gravels and underlying recent active beach deposits.

i. What is the character, date, condition and significance of deposits encountered?

5.1.12 No deposits have been physically encountered during the course of this evaluation; however, deposit modelling has significantly shown that land-based strata comprising Holocene alluvium/peat with underlying river gravels could extend onto the foreshore of the Site and survive beneath recent active beach deposits (**Figure 3**).

j. What is the extent of archaeological survival across the Site?

5.1.13 Due to lack of availability of cores from the foreshore, the extent of archaeological survival eastwards of the river wall is uncertain. The deposit modelling has indicated that archaeological survival is likely to be confined to the upper half of the foreshore, based on the modern foreshore profile in comparison to the modelled deposits of alluvium and organic deposits from the landward side of the river wall. The bathymetric data used in the condition monitoring does not suggest any areas of scour within the Site, only scour outside the Site to the immediate northeast from the Counters Creek outlet (**HEA**; **Figure 1**) underlying the present pier. The levels from the lower eastern section of the present foreshore in the deposit modelling (**Figure 3**) could suggest this has affected survival in the lower part of the foreshore, although this lies away from the proposed campshed zone.

k. What is the (seasonal) influence of tidal patterns and storm events on the archaeology of the foreshore?

5.1.14 Ongoing conditioning monitoring of the Site will provide a detailed assessment of tidal and storm event influences on the potential archaeology. Results are scheduled to be provided on a quarterly basis over the 2014/2015 assessment period, dependent on the rate of third-party resurvey.

5.2 Predicted archaeological survival

5.2.1 The results of this evaluation indicate the following predicted archaeological survival:

- **High potential** for palaeoenvironmental remains of **Low significance**;
- **Moderate potential** for redeposited prehistoric artefacts (**Low significance**);
- **Moderate potential** for prehistoric activity or settlement (**High significance**);
- **Low potential** for isolated Roman artefacts (**Low significance**);
- **Low potential** for early and later medieval features associated with the use of the river such as fish traps, timber revetments (**Medium to High significance**); and
- **High potential** for buried/obscured remains of a mid 20th century campshed with group value (**Medium significance**) on the foreshore.

5.2.2 In summary, this predicted archaeological survival reflects previous anticipated levels described in the OAWSI and ES (as summarised in Section 2 above). The evidence from the deposit modelling indicates that there is probable lateral continuity of strata from the landward side of the river wall comprising organic clays/peat and alluvium overlying river gravels. The organic clays/peat and alluvium have the potential to contain *in situ* archaeological remains. The depth and extent of survival on the foreshore cannot be accurately predicted due to a lack of borehole data from this area of the Site. The overall potential for archaeological survival remains **Medium**.

5.3 Significance

5.3.1 Based on the results of the evaluation at Cremorne Wharf Depot, the overall significance of the archaeological and palaeoenvironmental potential of the Site is deemed to be **Medium**.

5.4 Discussion

5.4.1 Although no fieldwork was able to be undertaken for this foreshore evaluation, the deposit modelling has shown that Holocene strata known from the landward side of the river wall is likely to continue onto at least the upper western part of the foreshore of the Site, although the depths and survival of deposits cannot be ascertained without borehole data from the foreshore.

5.4.2 Such organic deposits could contain *in situ* archaeological and palaeoenvironmental remains potentially dating from the Mesolithic to medieval period, and would be encountered underneath recent active beach deposits, which are more likely to contain remains of post-medieval/modern date.

5.4.3 Post-medieval flood defences and a 1930s campshed on the foreshore (of medium significance, derived from the evidential and historical group value

of the remains) are known from previous foreshore surveys to exist within the Site and will be directly impacted by the proposed campshed, although the depth of impact is currently not known.

5.4.4 If further work was to be undertaken, dependent on the results, there is the potential to contribute to the TTT Route-wide Heritage Themes:

- Theme 1: Palaeoenvironment and prehistory. Interpretation could also take into account the results from other nearby sites (MOLAS 2002, Archaeoscape 2008 and Branch *et al* 2010) in order to impart the changing archaeology and environment of the Site through the Holocene.

- Theme 4: London's water systems and public health. The 1930s campshed may be associated with the Grade II listed Lots Road Pumping Station (built 1904 but altered in the 1930s) and/or the Counters Creek Sewer and so has group value. Further documentary research may be able to determine which association is more likely.

6 Predicted impacts and recommendations

6.1.1 The following predicted impacts of the proposed works have been identified:

- Construction of CSO shaft and associated chambers/ducts will have a localised direct impact on any surviving archaeological and palaeoenvironmental remains (described in section 5.2 above) within their footprint.
- The refurbishment of the existing 1930s campshed on the foreshore for the provision of construction supplies (**Figure 1**) would have a direct impact, removing some of the original fabric of this asset of moderate significance. Any scouring around the edge of the proposed campshed would have direct impact on other unrelated surviving archaeological remains (described in section 5.2 above), although these may have been truncated during the original campshed construction.

6.1.2 It is recommended that an archaeological watching brief be undertaken in order to monitor enabling and construction works affecting the foreshore. Such a watching brief should have defined aims and be targeted to record the known 1930s campshed and post-medieval timber remains, and any other potentially surviving *in situ* archaeological remains; as well as a programme of geoarchaeological augering, and sampling as appropriate, to inform our knowledge of the palaeoenvironment of the Site.

6.1.3 Further to the recommendations set out above, mitigation options will be reviewed and developed by the appointed EAC in collaboration with the TTT archaeology and heritage team and the main works contractors. The proposed mitigation strategy will then be set out in a SSAWSI, to be submitted to and approved by the London Borough of Kensington and Chelsea's Archaeological Advisor prior to the commencement of any on-site enabling and construction work.

Appendix A: Specialist reports

A.1 Deposit modelling: transect descriptions (Figures 2-3)

Transect A

Transect A ran north-west to south-east across the south-west end of the Site, and contained five deposit records. The transect was approximately 90m long, all deposit record data points were positioned on the landward side of the river wall because no deposit records were available from the foreshore of the Site.

The first record TQ27NE127 was located at the north-west end of the transect where the deposits were recorded as 3.66m of made ground over 3.2m of peat and organic clay, overlying 0.91m of river gravels above the London Clay. Moving 11m south-west along the transect, the second deposit record TQ27NE1886 contains 3.2m of made ground overlying 2m of alluvium over 1.8m of peaty clay. The peaty clay overlies 0.9m of river gravels, which in turn overlay the London Clay.

The third deposit record TQ27NE128 consists of 2.9m pf made ground over 0.9m of alluvium, over the London Clay at 1.08m OD. The fourth deposit TQ27NE129 is located approximately 7m to the west of the river wall and consists of 3.04m of made ground over 3.36m of alluvium over 0.61m of river gravels, over the London Clay at -1.83m OD.

The surface of the London Clay across the transect was irregular with a maximum difference of approximately 3.98m, the highest point 1.08m OD was midway along the transect at TQ27NE128, dropping down to -2.9m OD to the north-west at TQ27NE1886 and -1.83m OD to the south east at TQ27NE129. The irregular profile of the surface of the bedrock geology is possibly indicative of large-scale scour by Pleistocene channels. The London Clay was overlain by river gravels of fluvial silts, sands and gravels that varied in thickness from 0.9m to 0.6m in thickness.

The upper surface of the present modern foreshore of the Site is indicated by the red line in Transect A, and is based on bathymetric data (**Appendix A.2**). The deposit modelling suggests that some alluvial and/or river gravels may still survive between the modern active beach deposits and the underlying London Clay towards the upper part of the foreshore.

Transect B

Transect B ran north-west to south-east across the north-east end of the Site, and contained three deposit records. The transect was approximately 115m long and again all deposits record data points were positioned on the landward side of the river wall.

The first record TQ27NE439, located at the north-west end of the transect consisted of 0.76m of made ground overlying 4.42mn of river gravels, which in turn overlay the London Clay. The second deposit record was TQ27NE130 located approximately 70m along the transect to the south-east and consisted of 2.69m of made ground over 4.65m of alluvium and peat, which in turn overlay the London Clay.

The third deposit record was TQ27NE131, which was located approximately 8m to the west of the embankment. The deposits consisted of 4.57m of made ground over 1.83m of alluvium and peat, which in turn overlay 1.52m of river gravels which

overlay the London Clay. The surface of the London Clay was fairly uniform with a shallow slope from north-west to south-east.

River gravels overlying the London Clay were recorded at TQ27NE439 at the northwest end of the transect and at TQ27NE131 near the river wall, with only peat overlying the London Clay between them at TQ27NE130. This suggests that the peat may have formed in an abandoned channel which was part of an earlier course of the river and abandoned due to channel migration.

As with Transect A, the upper surface of the modern foreshore in Transect B was mapped using bathymetric data (**Appendix A.2**) and is indicated as a red line. The profile has a regular shallow slope before falling steeply, levelling out then rising gradually. This depression with the foreshore profile is as a likely result of scouring caused by the discharge from an outfall pipe located approximately 10m to the north of the transect.

From a comparison of the height of the modern foreshore profile against the deposits displayed in the transect it is conceivable that some organic deposits and earlier river gravels may still survive below the active beach deposits at the upper western end of the Site's foreshore.

A.2 Data references

Deposit record	Source	Easting	Northing	Elevation mOD	Total depth Metres
MoLA-SR6360	MoLA	526505	177079	5	10
TQ27NE126	BGS	526420	177020	6.25	11.28
TQ27NE127	BGS	526470	177100	5.82	15.46
TQ27NE127/B	BGS	526470	177100	5.18	15
TQ27NE128	BGS	526510	177080	4.88	12.5
TQ27NE129	BGS	526540	177060	5.18	15
TQ27NE130	BGS	526530	177130	5.64	14.63
TQ27NE131	BGS	526550	177100	5.49	8.23
TQ27NE1706	BGS	526430	177020	5.18	13.41
TQ27NE1886	BGS	526479	177094	5	20
TQ27NE1889	BGS	526525	177027	5	6
TQ27NE1890	BGS	526467	177015	5	20
TQ27NE391/A	BGS	526550	177070	0.94	21
TQ27NE439	BGS	526480	177180	5.64	10
TQ27NE908	BGS	526412	177056	4.81	15.24

Key to source
MoLA = Museum of London Archaeology
BGS = British Geological Survey

Data references
MoLA = 'MoLA monitored TTT core data supplied by client, ref. email from Suzanna Pembroke 31/3/14'

BGS = http://www.bgs.ac.uk/data/boreholescans/home.html

DDS-000690-WXARC_Bathymetry (Transmittal: 100/WXARC/000009 Date: 13/8/14 Filename:100-MD-GIS-WXARC-000004)

Appendix B: NMR OASIS archaeological report form

OASIS DATA COLLECTION FORM: England

Printable version

OASIS ID: wessexar1-204814

Project details

Project name	Foreshore-based Archaeological Evaluation, Cremorne Wharf Depot
Short description of the project	Wessex Archaeology was commissioned to undertake a foreshore-based archaeological evaluation at Cremorne Wharf Depot, a Thames Tideway Tunnel project site. The evaluation included: geoarchaeological assessment of available geotechnical data, and the production of a foreshore deposit model. The methods used at this site were somewhat restricted by physical conditions and position of existing infrastructure.
Project dates	Start: 01-10-2014 End: 27-02-2015
Previous/future work	Yes / Yes
Any associated project reference codes	102510.35 - Contracting Unit No.
Type of project	Field evaluation
Site status	None
Current Land use	Coastland 1 - Marine
Current Land use	Coastland 2 - Inter-tidal
Monument type	NONE None
Significant Finds	NONE None
Methods & techniques	"Augering"
Development type	Tunnel
Prompt	Planning condition
Position in the planning process	After full determination (eg. As a condition)

Project location

Country	England
Site location	GREATER LONDON KENSINGTON AND CHELSEA KENSINGTON AND CHELSEA Cremorne Wharf Depot
Study area	0.60 Hectares
Site coordinates	TQ 2647 7716 51.478742189 -0.178602938661 51 28 43 N 000 10 42 W Polygon
Site coordinates	TQ 2647 7706 51.477843391 -0.17863874953 51 28 40 N 000 10 43 W Polygon
Site coordinates	TQ 2659 7716 51.4787152922 -0.176875660761 51 28 43 N 000 10 36 W Polygon

Site coordinates	TQ 2659 7706 51.4778164951 -0.176911505545 51 28 40 N 000 10 36 W Polygon
Height OD / Depth	Min: -1.75m Max: 0.50m

Project creators

Name of Organisation	Wessex Archaeology
Project brief originator	Wessex Archaeology
Project design originator	Wessex Archaeology
Project director/manager	David Norcott
Project supervisor	Gail Wakeham
Project supervisor	Richard Payne
Type of sponsor/funding body	Developer

Project archives

Physical Archive Exists?	No
Digital Archive recipient	Wessex Archaeology
Digital Archive ID	102510.35
Digital Contents	"none"
Digital Media available	"Database","GIS","Images raster / digital photography","Text"
Paper Archive recipient	Wessex Archaeology
Paper Archive ID	102510.35
Paper Contents	"none"
Paper Media available	"Report"

Project bibliography 1

Publication type	Grey literature (unpublished document/manuscript)
Title	Foreshore-based Archaeological Evaluation Report Cremorne Wharf Depot
Author(s)/Editor(s)	Norcott, D., Payne, R. and Wakeham, G.
Date	2015
Issuer or publisher	Wessex Archaeology
Place of issue or publication	Salisbury
URL	http://oasis.ac.uk

Entered by	Richard Milwain (r.milwain@wessexarch.co.uk)

Entered on 27 February 2015

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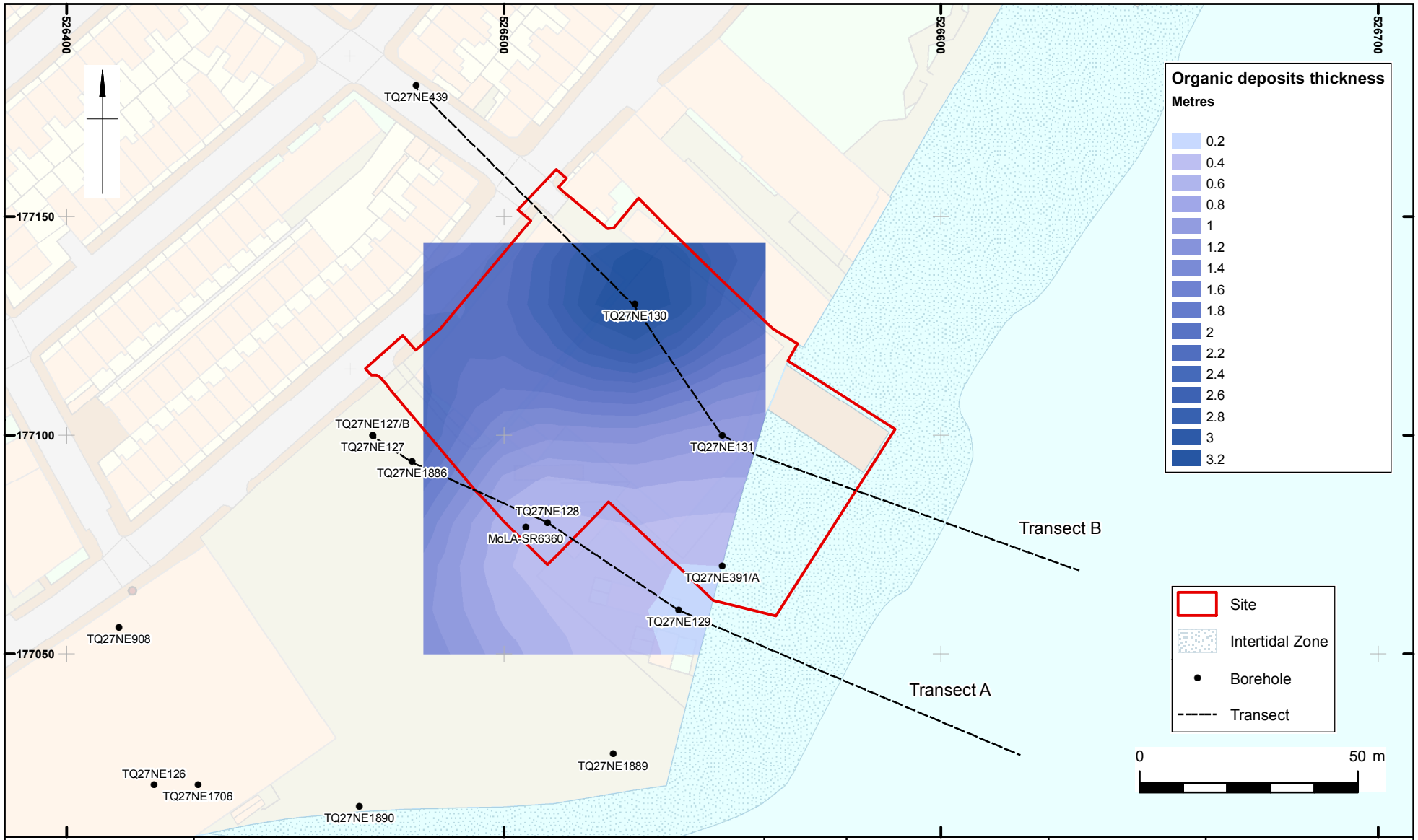
Cite only: http://www.oasis.ac.uk/form/print.cfm for this page

Figures



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Organic deposits thickness model

Figure 5

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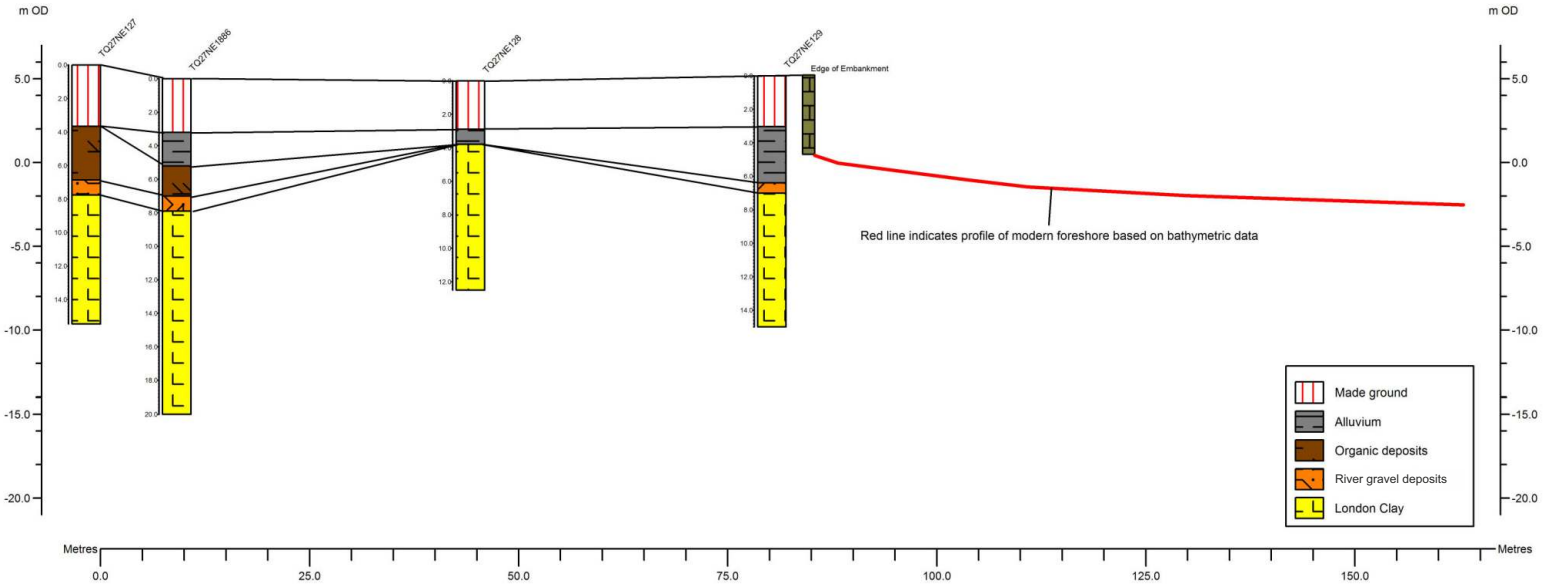
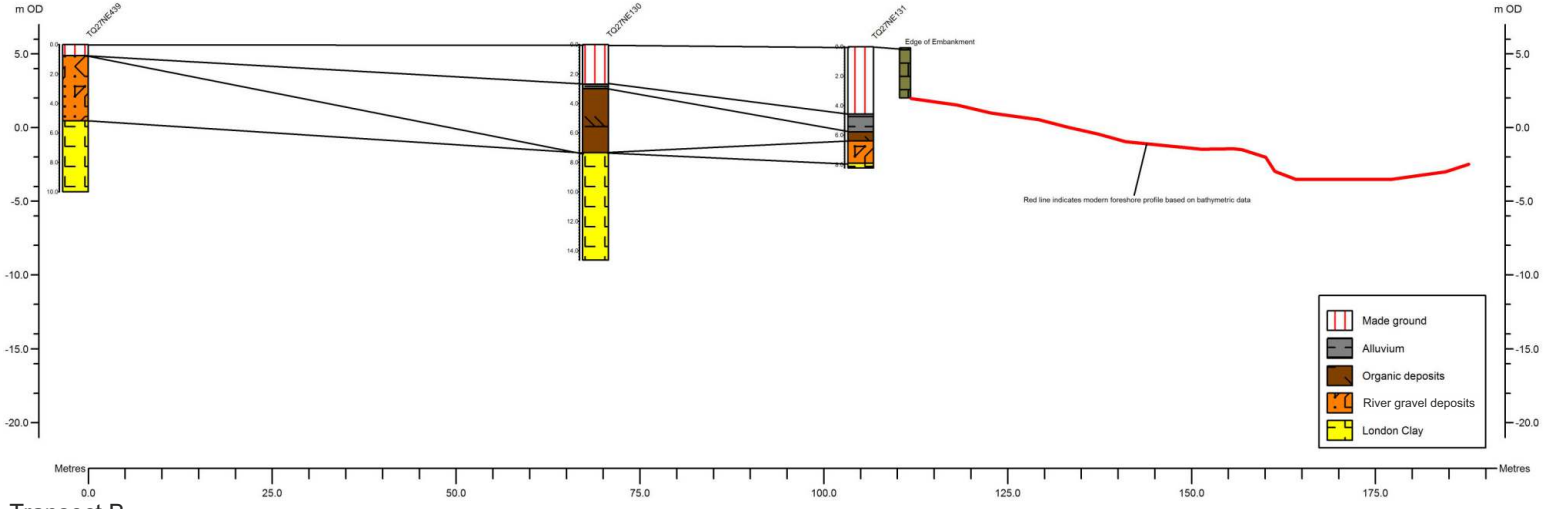
Modelled surface of river gravels

Figure 4



Transect A



Transect B

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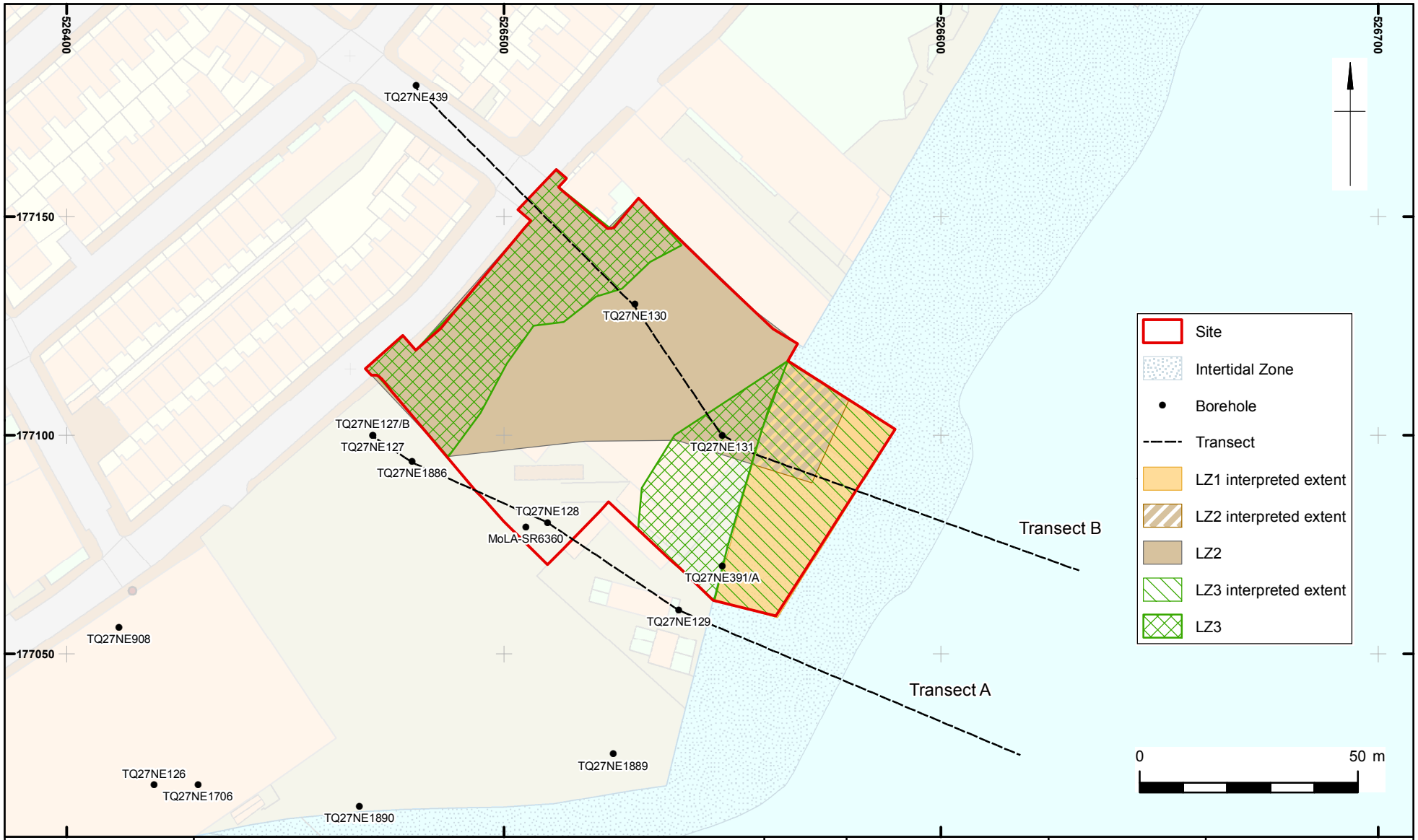
Deposit modelling results Cremorne Wharf Depot (transects A to B)

Figure 3



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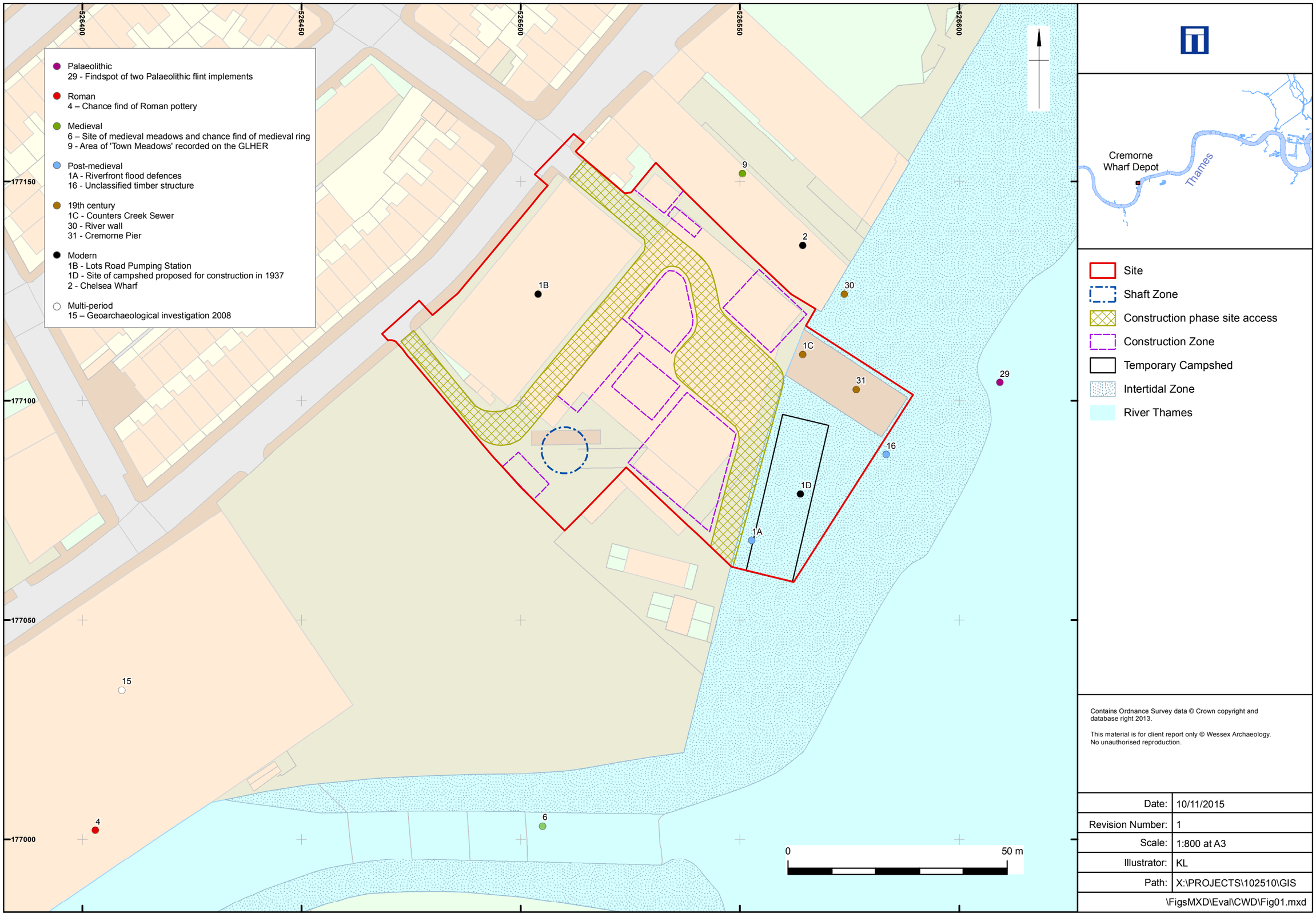
Deposit modelling: location of transects and predicted Landscape Zones

Figure 2



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	\FigsMXD\Eval\CWD\Fig01.mxd

Cremorne Wharf Depot evaluation location with known Historic Environment Assets (HEA)

Figure 1

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