19 QUEEN ELIZABETH STREET
London SE1

London Borough of Southwark

Watching brief report

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MOLA

REGISTERED CIfA ORGANISATION

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Report on an archaeological watching brief

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Summary

This report presents the results of an archaeological watching brief carried out by MOLA at 19, Queen Elizabeth Street, London, SE1 2LP. The report was commissioned from MOLA by Hollybrook Ltd.

In accordance with the Written Scheme of Investigation, (MOLA 2014), a watching brief was carried out on the site between the 23rd of February and the 19th of June 2015. This report presents the results of that watching brief and assesses earlier evaluation results and geoarchaeological works undertaken on the site.

The natural gravels were encountered at c -2.60m OD and were overlain by c 6m of archaeological formation. A silted up paleo-channel formed the early part of the sequence and the area appeared to have been periodically flooded between drier phases occurring during the prehistoric period. The site was marginal land until it was probably incorporated within a system of water meadows with an associated drainage channel in the historic period.

The first evidence for a building on the site is thought to date to the later 17th or early 18th century. Later post-medieval activity involved the raising and consolidation of the ground level and culminated with the late 18th- and 19th-century development of buildings on the street frontage as shown on historic mapping for the site.

Geoarchaeological monolith sampling undertaken at the site recorded prehistoric sediments representing the formation of channel bars and islands used by prehistoric peoples for very short periods. Worked and burnt flint was recorded on the sand and silt banks/mid-channel bars that formed in the less constrained early Holocene tributary valley. This probably represented short-lived activity camps situated in close proximity to the resources of the river. During the Roman period the deposit sequence was represented by open grass-lands periodically waterlogged by river flooding. Such conditions would have made Roman occupation highly unlikely at the site in relation to its locations within a low lying channel valley that cut into or bisected the Horsleydown eyot. The upper alluvial sequences representing waterlogging and estuarine inundation of this low lying tributary floodplain up into the historic period.

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1 Introduction

1.1 Site background

1.1.1 An archaeological watching brief was carried out by MOLA at 19, Queen Elizabeth Street, London, SE1 2LP, ('the site'), between the 23rd of February and 19th of June 2015. This document is the report on that work.

1.1.2 The site is the corner plot on the north side of Queen Elizabeth Street on the western side of the junction with Lafone Street. It is bounded to the north by a property fronting onto Lafone Street and to the west by Tower Bridge Square. The centre of the site lies at National Grid reference 533657 179926, (see Fig 1). The ground level upon the site was at *c* 4.57m OD.

1.1.3 A desk top Archaeological Assessment (HEA) was previously prepared which covers the whole area of the site (MOLA 2013a). This document should be referred to for information on the natural geology, archaeological and historical background of the site (and the initial assessment of its archaeological potential).

1.1.4 Field evaluation was carried out by MOLA in July 2013. An Evaluation Report was written on the results (MOLA 2013b). The trench location of this previous evaluation work is shown on Fig 2.

1.1.5 Further to the condition on Planning Consent a Written Scheme of Investigation (WSI) was prepared by MOLA (MOLA 2014). The archaeological work has been carried out in accordance with that WSI.

1.1.6 The new development entailed construction of a basemented extension adjacent to the western side of the existing building. Additionally deep underpinning and enabling works were proposed for the western side of the site. The archaeological watching brief was devised to monitor these works and the extent of the watching brief is shown on Fig 3.

1.2 Planning background

1.2.1 The legislative and planning framework in which the watching brief took place was fully set out in the in the previous Historic environment assessment (MOLA 2013a, section 9).

1.2.2 The development received planning permission (planning reference 13/AP/2405) on 14th March, 2014 and included Conditions 4 and 5 pursuant to archaeology. Further to this, on 18th June 2015 an application was granted to vary the consented scheme under planning application reference 15/AP/1236 (and also included Conditions 4 and 5 pursuant to archaeology).

1.2.3 Scope of the watching brief

1.2.4 The watching brief was carried out within the terms of the relevant Standard for watching brief specified by the Institute for Archaeologists (CIFA 2014). All work has been undertaken within the research priorities established in the Museum of London's A research framework for London Archaeology, 2002. All work was undertaken considering the objectives established in the Written Scheme of Investigation for the watching brief (Section 2).

1.2.5 The consented scheme comprises refurbishment of the existing building and construction of an additional storey over the existing structure. Within the current open car park in the western part of site, it is proposed to construct a new three storey, basemented extension. The basement area included a lower ground and sub-basement levels, the lower of which will have a finished floor level of -1.31m OD

or *c* 5.80m below ground level. The impact of this on the surviving archaeological deposits will be to remove deposits to a level of at least 6m or greater below ground level outside the limits and depths of the previous evaluation trench located in this area. Undertaking the watching brief on the site would establish where and if archaeological deposits survive and ensure that the proposed groundworks do not involve the destruction of any archaeological deposits on the site.

2 Topographical and historical background

2.1.1 A detailed description of the geology, archaeology and history of the site was provided in the earlier Historic Environment Assessment (MOLA 2013a). A brief resume is provided here:-

2.1.2 The site lies *c* 190m south of the River Thames. The general area is naturally low-lying, within the floodplain of the river. The natural geology of river terrace gravel has been eroded by a series of secondary river channels to form islands (eyots). Archaeological work in the area has established the outline of an island about 700m east–west and 300m north–south at its greatest extent (Horselydown Eyot). It extends eastward beyond Tower Bridge to the inlet St Saviour's Dock (the mouth of the former river Neckinger that marked the eastern edge of the eyot). The site location is towards the northern edge of the island.

2.1.3 As sea and river levels fluctuated over time, flooding caused the deposition of alluvium over low-lying parts of the eyots. The site is situated *c* 45m to the south-west of the gravel/alluvial interface on Horsleydown eyot. Within the alluvium are layers of peat, which formed during periods when water levels were relatively low (marine regressions). The alluvium is extensive in central and east London, and further down the estuary it can be very thick. The alluvium, and the plant and animal remains it contains, can provide valuable palaeo-environmental information about the nature of the surrounding environment and human interaction with it, in relation to ongoing changes in river regime.

2.1.4 Previous archaeological investigations have shown that eyots in the Thames at Westminster, Southwark and Bermondsey were often the focus of prehistoric settlement and agricultural activity (Merriman 1992, 262). These landscape horizons may occur within or beneath alluvial peats and silts although they were vulnerable to erosion as a result of subsequent rises in river level and so the state of preservation varies.

2.1.5 Evidence from investigations in the site vicinity suggests that during the Mesolithic period the site was in an area of marshy ground crossed by river channels. Human activity is largely characterised by finds of flint tools and waste rather than structural remains. During the Bronze Age it is likely the site was located, at times, on a dry island within the Thames close to or within an area of settlement and cultivation. It is likely that during the Iron Age, the island on which the site is located became increasing marshy and subject to flooding which resulted in the area being less intensively occupied than it had been in the Bronze Age.

2.1.6 During the Roman period the Southwark (Borough) island was the main focus of settlement and a bridge across the Thames. The Horsleydown eyot was probably in a marshy area on the periphery of Roman occupation.

2.1.7 During the early medieval period the site was located in an area of unoccupied marshland. No structures or artefacts of early medieval date have been recovered from within the site vicinity. It is probable that owing to the post-Roman marine transgression, the area was too severely inundated to permit any significant level of exploitation during these centuries. However the presence of Tooley Street, which crosses the middle of Horselydown Eyot, does suggest that this strip of higher ground was known to those who laid out the thoroughfare in the early medieval period.

2.1.8 The site continued to be largely uninhabited marsh land until the 14th century after which time the site was probably open grazing land. Until the later medieval period the low-lying area which now forms north Southwark was prone to flooding, and consisted of marsh and tidal mudflats surrounding a number of higher eyots. The landscape was gradually transformed by land reclamation, drainage schemes and

the construction of river defences. By the late medieval period, there was a certain amount of industry in the area.

2.1.9 The earliest detailed map to show the site and its surrounds is Faithorne and Newcourt of 1658. The area to the north and east of the site, along the river frontage and Savory Dock, appears to be built up, but the site itself is located in an area of open ground to the rear of these properties. The site appears to have been open ground, possibly used for grazing until the late 17th century when buildings are indicated on the Morgan map of 1682 (see front cover). It is uncertain if these buildings extended to the west of the site. By the second half of the 18th century cartographic sources show the site was occupied by buildings. Rocque's map of 1746 shows the site to the north of a tenter ground, associated with the production of cloth, and to the west of a timber yard. This map shows the site as occupied by buildings fronting John Street, which later became Boss Street, on the western side of the site and buildings fronting onto a street referred to as Goat Yard on the eastern side.

2.1.10 Horwood's map of 1799 shows a row of five houses fronting Queen Street, with gardens to the rear and a building fronting a yard in the south. The western side of the site was occupied by gardens of 1–4 John Street. Various phases of structures occupied the site until the 20th century when by this time the site was used for warehousing. A brick date plaque on the current building at 19 Queen Elizabeth Street shows it was constructed in 1904. The 1914 Ordnance Survey map shows the current building standing on the eastern side of the site. This map shows the western side of the site occupied by gardens and outhouses of the Boss Street houses.

2.1.11 The London County Council World War II bomb damage map (London Topographic Society, 2005, map 77) shows the building at 19 Queen Elizabeth Street had been damaged by a V1 rocket. The houses fronting Boss Street to the west of the site had been damaged beyond repair and the western area of the site is shown as a clearance area.

2.1.12 The 1950 Ordnance Survey map shows the gardens and outbuildings on the western side of the site had been demolished during the Second World War had been replaced by a warehouse fronting onto Boss Street with an access way to the west of 19 Queen Elizabeth Street. The northern half of Boss Street including the warehouse was demolished for the Tower Bridge Square development to the west and north of the site which was completed in 1987. The area to the west of the early 20th century 19 Queen Elizabeth Street building is now open ground and in use as a car park.

Previous archaeological evaluation on the site – site code QEL13

2.1.13 Archaeological evaluation in June 2013 (MOLA 2013b) in the site's car park revealed 1.20m depth of post-medieval dumped infill deposits, consistent with the documentary evidence which suggests that this was an external yard and back garden area behind former buildings fronting Queen Elizabeth Street. These deposits were part of the reclamation of a much earlier marshy area evidenced by a further *c* 7.62m depth of alluvial deposits forming part of an unusually deep natural water channel. Samples suggest that this sequence represents a substantial timescale, beginning as a fast flowing channel in the Mesolithic period (*c* 10,000 years ago) gradually silting into a marshy sedge backwater and then a water meadow, prior to the post-medieval land reclamation. Because this was an open waterway during the Bronze Age (*c* 3,000 years ago) the rare evidence of early agriculture of that period found elsewhere in the locality, a principal objective of the field evaluation, was not present.

3 The watching brief

3.1 Field methodology

3.1.1 The slab was broken out and the ground reduction undertaken by contractors under MOLA supervision. Areas were excavated by machine with hand digging where required by MOLA to investigate features/deposits revealed across the site.

3.1.2 The ground was mechanically graded off gradually in spits, progressively from the back of the site towards the front. Each series of spits was cumulatively taken down until a swathe of c1m to c1.20m in thickness had been removed. The process was then repeated several times and features recorded where necessary.

3.1.3 All archaeological features and deposits were investigated and artefacts collected. A specialist report upon the material finds forms appendix 1 to this report. Where expedient and advantageous soil samples were also taken. The soil samples consisted of two types. Vertical blocks of undisturbed sediment were extracted by the means of “monolith tins” driven sideways into the stratigraphy; additionally, where appropriate, specific layers were individually apprised by the collection of bulk samples. All of the samples were retained for analysis of the archaeological environment; the report upon that aspect of the site forms Appendix 2 to this document.

3.1.4 Archaeological excavation of features was carried out in accordance with the *Written Scheme of Investigation* (MOLA 2014).

3.1.5 The areas of investigation and archaeological features were plotted on plans provided by the client using an ‘offset methodology’ and subsequently tied to the Ordnance Survey grid by MOLA Geomatics.

3.1.6 Geoarchaeological monolith sampling was also undertaken on the site, the full methodology for this sampling is detailed in the Appendix.

3.2 Recording methodology

3.2.1 A written and drawn record of all archaeological deposits encountered was carried out in accordance with the Written Scheme of Investigation (MOLA 2014).

3.3 Site archive

Number of trench record sheets	0
Number of overall location plans	1
Number of Context (SU) sheets	63
Number of photographs	216
Number of Plan sheets	2
Number of Sections	7

4 Results of the watching brief

4.1.1 Generally the watching brief revealed a sequence of sedimentary silts deposited within a large palaeochannel which subsequently resulted in an area of marshy ground. Subsequent activity indicated that the marshy ground was later drained and managed as water meadows prior to more intensive exploitation of the plot for building purposes. The channel and its deposition sequence is briefly discussed below, its geo-archaeological interpretation is more fully considered in a separate study appended to this document (see Appendix).

4.1.2 For the location of the area of investigation see Fig 2. For area and feature plans see Fig 3. For the post-channel sequence and for the top of the channel sequence see Fig 4.Two of the section drawings, Fig 5 and Fig 6 are used to illustrate the general site sequence whilst photographic images form the remainder of the illustrations from Fig 7 to Fig 19 and show more specific details of particular contexts as well as more general subjects.

4.1.3 All of the archaeological deposits and features were designated as numerical contexts. The most significant of those have been herein described and are denoted with square brackets, ie [67].

4.2 Proposed Basement (Area 1)

Location	An open area to the west of the existing basemented building
Dimensions	*c* 25m by *c* 15m by *c* 6m depth
Modern ground level/top of slab	4.57m OD
Base of modern slab	4.27m OD
Depth of archaeological stratigraphy above natural	*c* 6.50m
Level of base of lowest features or deposits observed	*c* -2.60m OD
Top of surviving natural observed at	*c* -2.60m OD
Level of base of trench	*c* -2.60m OD

4.2.1 The external area of the site was *c* 25m from north-east to south-west and 15m from north-west to south-east. The ground surface lay at 4.57m OD; within the new building footprint for this part of the site total ground reduction was undertaken to *c* -2.60m OD. It was apparent that modern intrusions, particularly deep drainage associated with the standing building had disturbed localised areas to a depth of *c* 3.50m (1.07m OD).

4.2.2 Natural gravel was encountered at *c* - 2.60m OD (ie 2.60m below datum). Overlying this material were a series of sedimentary deposits, comprised of clays, silts and sands that had formed within a palaeochannel associated with the Horsleydown eyot. The channel would have been subjected to periodic flooding with drier periods between inundations. After final silting up the area would have then remained marshland.

4.2.3 The primary deposits in the channel comprised a series of thinly banded fluvial sands and silts which varied in colour. The majority were light to dark yellow but also with some light brown and dark brown bands mostly of 30mm to 50mm thick, seldom exceeding 100mm. The combined thickness was of *c* 2m and was grouped together as context [67] (Fig 17); the surface of which lay at *c* -0.43m OD (ie 0.43m below datum).

4.2.4 Overlying context [67] were further banded material of silts and sand, context [62], (Fig 15) the lowest bands of which included a marl-like material. The bands varied in thickness between 0.10m and 0.30m. The cumulative thickness was 0.70m to *c* 1.15m, the surface at *c* 0.55m OD to *c* 0.85m OD. Sealing context [62] there was a layer of yellow to orange-yellow sand, context [48] (Fig 15 and Fig 16), this was of up to *c* 0.25m thickness at *c* 0.85m OD to *c* 0.95m OD.

4.2.5 A silty sand deposit, context [47], (see Fig 15 and Fig 16) of *c* 0.20m to 0.30m thickness was seen at *c* 0.82m OD to *c* 0.97m OD and within this deposit a small quantity of prehistoric flint artefacts were recovered. These consisted principally of six small fragments of burnt or calcined flint, commonly referred to as “pot boilers” and two small waste flakes from flint tool production. These possibly date to the Bronze Age and suggests that within this period the site was dry enough for human activity.

4.2.6 The site itself lies within the low-lying floodplain of a possible early Holocene valley inhabited by a tributary channel of the River Thames, south-west to north-east aligned. The tributary appears to drain or bisect the Horselydown eyot and monolith samples taken from deposits [47], [48] and [62] are thought to be deposits associated with this channel with deposit [62] suggesting evidence of silting up/sluggish flow possibly attributed to a less confined early Holocene channel. A monolith sample taken from clay deposit [6] from section 1 during the evaluation phase of the site at the west also suggests similar activity of possible alluvial deposition with signs of river action/flood events possibly attributed to a less confined early Holocene channel. The pollen remains from monolith sample taken from these contexts record an open herbaceous environment with few trees and possible sedge fen, this is indicative of the Late Glacial and early Holocene.

4.2.7 The next formation was a bluish grey sandy silt of *c* 0.50m to 0.70m thickness context [46], (Fig 15 and Fig) thought to represent silting after inundation across the site. No archaeological artefacts or features were identified within this deposit and its surface lay at 1.47m OD to 1.57m OD. On its surface was a localised deposit of yellow to orange-yellow sand, context [51] 0.50m thick which filled a small depression, possibly evidence of a tree throw with an upper height of 1.97m OD.

4.2.8 Over deposit [46] was a light to mid brown ferrous stained silty clay alluvium, context [45], this was up to 1.40m thick and probably represented the final stages of deposition culminating with water meadow formation in the historic period. The surface of this was at *c* 3.10m OD. A layer of dark greyish brown clayey silt, context [44], of *c* 0.20m in thickness had formed over [45]; at *c* 3.30m OD. These contexts were geoarchaeologically interpreted as an Early to mid-Holocene semi- terrestrial alluvial deposit with evidence of vegetation and higher energy river action/flood events.

Later site development

4.2.9 The first site development was a drainage channel and footings of a building cutting into [45].The drainage channel, context [61] also cut through [45] at a height of *c* 3.07m OD and is thought to possibly be late medieval or earlier post-medieval in origin. This was greater than 5m wide and traversed the site from roughly north-east to south-west, and was *c* 3.50m in depth with the base at c -0.43m OD. The eastern edge was not clearly seen as it was encroached upon by the footings of the standing building. It was presumed to have been manmade or an existing watercourse that had been developed and managed.

4.2.10 A grey banded sandy silt, context [63] (Fig 13), had formed on the western side or bank of the channel whereas in the base lay a grey sand, context [60] and may have formed before the channel began to silt up. A grey clayey silt, context [50], appeared to confirm this as it contained water snail shells, organic matter and occasional pottery sherds of a 17th-century date including part of a biscuit-fired delftware salt

(1638–84) suggesting the channel was open in the mid-17th century. The final demise of the channel appeared to have begun with a further deposit of grey silt, context [49]; which also included sherds from a Surrey-Hampshire border ware costrel dated to 1660-80 and clay tobacco pipe fragments also a late 17th-century date (*c*1660–80).This suggests the channel went out of use at this time and subsequently the ground level was raised in advance of the more intense building phases of the 18th century and later.

4.2.11 On the western side of the site were two parallel trench built wall footings, 4.50m apart, aligned north-west to south-east which provided the earliest evidence for a building upon the site. The westernmost of the two, context [40], was of 0.35m wide and the northern, context [42] (Fig 12), 0.58m wide. They survived to a height of six courses, up to *c* 3.32m OD to *c* 3.45m OD, built of orange red unfrogged brickwork in English Bond with off white lime and sand mortar. The proximity of these two footings to each other suggested that they were the contemporaneous side walls to a building. There was neither structural evidence for them to the east of the new capping beam nor a return between them and it is thought that a return would have lain on the edge of the newly shuttered trench. To the north they both extended beyond the limit of excavation. This may have been a domestic structure or alternatively an outbuilding or workshop and is was thought to be 17th century date. This cut through deposit [45] but was not considered to be associated with channel [61] with which there was no direct association. Disuse of the building was represented by a localised layer of decayed mortar, context [39] (Fig 11 and Fig 12), of up to 0.20m that lay across the top of [40] and [42] and otherwise extended further, over [44] at a height of *c* 3.45m OD ad is thought to date to the early 18th century.

4.2.12 Activity in the first half of the 18th century was represented by a thick deposit of dumped soil and rubbish across the area, context [38] *c* 1m deep to a height of *c* 4m OD. This clayey and sandy silt deposit included scatters of pottery of plain glaze and decorated London delftware in a number of standard forms (plates, jars and so on) made here in the late 17th to early 18th century. Examples of a few waster sherds dumped from one of the many delftware pothouses located in Southwark include the fused rim sherds of two pale blue glazed rounded bowls decorated in the Chinoiserie style. Glass fragments in the deposit were two mid-18th–century English made bottle types: the mallet and early cylindrical bottle. Clay tobacco pipe material were two pipe bowl dated to *c*1680–1710 and five bowl types dating to *c*1700–70. Possible building material (?peg tile) from this deposit also dates to the first half of the 18th century.

4.2.13 The subsequent development of the site consisted of the housing erected on the street frontages. Little of these buildings remained, the greater part having been removed by later development. On the western side of the site a modern drainage run isolated all the later structural remains on that street frontage. These had been built on a layer of material, context [21], which was evidently part of the same deposition as [38]; it was of a similar composition and survived to a height of *c* 3.77m OD.

4.2.14 Two later phases of building were evident on the street frontage, the earlier one assumed to be of a later 18th-century date and consisted of an orange red brickwork footing in English bond with off white lime and sand mortar, context [19] (Fig 10). This was of 0.80m width and of more than two courses in height and had been cut into layer [21]. The wall had been latterly robbed down to 3.42m OD and demolition material, contexts [14], [15] and [17], had been spread to provide consolidation up to *c* 3.60m OD to 3.85m OD, before replacement by a later build. The alignment of [19] was thought to lie at an approximate right angle to the street frontage.

4.2.15 It could not be ascertained if [19] was associated with the remnant of a flagstone

floor, context [22] (Fig 10), the flags, probably limestone, were 0.60m by 0.30m and 0.06m thick and laid horizontally, the edges parallel to the western side of [19]. The robbing of the latter down to the same level as [22] might suggest an original association and therefore a sub cellar level. Only three slabs survived and were covered by [14] and [15].

4.2.16 A trench built wall, context [16] (Fig 10), had been cut through the demolition layers [14], [15] and [17]. This short length of wall was at a tangent to all the other walls and its appearance implied that it might have been associated with a drain or alternatively, if it had been pushed out of alignment then perhaps as a support for joists. Parts of five courses of English bond brickwork survived, up to 3.80m OD; the bricks were unfrogged, pinkish red and yellow with off white lime and sand mortar, the lowest course coincidentally set above [22].

4.2.17 Demolition and clearance ahead of further construction was apparent as a horizontal terracing cut, context [13], had been created, at *c* 3.60m OD to 3.80m OD; this was in preparation for a nineteenth century build represented by a series of parallel brick wall footings, contexts [10], [11] and [12]; these were built at right angles to the frontage,; all were thought to be internal and [11] and [12] perhaps supports for floor joists. Modern destruction had occurred across [10] at 4.07m OD and [11] and [12] at 3.92m OD.

4.2.18 Further remains of these structures were apparent partially exposed in section on the site frontage on the outside of the new capping beam.

4.2.19 A brick wall footing, context [27] (Fig 8), survived to a height of 3.72m OD, it was of a similar style to [19] and considered to be a continuation of this wall. To the west was a parallel wall, at a distance of 6.50m which survived to a height of 4.22m OD. Equidistant between these two walls there was a narrower wall at 3.42m OD, possibly an internal or partition wall within a cellar formed by [27] and [29]. Set on the top of [27], up to 4.22m OD, was a narrower rebuild, context [24], a wall of eight courses, in similar style but of only 0.35m width, the lowest two courses formed a corbel stepped out on the south side. The materials were of a mixture of reused orange red as well as purplish red bricks, a white lime and sand mortar had been used.

4.2.20 A series of alternating layers of demolition rubble and silt mixed with ash and clinker, contexts [25], [26], [31], [32] and [33] lay over wall [28] and provided infill that lay against [24], [27] and [29]. Although no underlying floor was identified it was from these deposits that it was deduced that the frontage was cellared. This was further supported by evidence for a demolition rubble deposit, context [34], that lay against the northern side of [29]; it also appeared to lie against the western side of another wall footing, context [35], which was adjacent to the north western corner of the site, aligned north to south, 4.00m east of the site frontage. The wall, [35], was of similar dimensions and form as [29] but was composed of a mixture of reused orange red as well as pinkish red with yellow bricks. Wall [35] survived to a height of 3.92m OD; it was cut through deposit [38], suggesting therefore that it formed a back wall to the cellared aspect of a building and was likely to have formed the return to [29].

4.2.21 The higher sequence across this part of the site consisted of approximately 0.30m of rubble and demolition material levelled and consolidated for a concrete slab of *c* 0.25m to *c* 0.30m in thickness; the ground surface at *c* 4.57m OD.

4.3 Existing basement area

Location	The basement to the standing building
Dimensions	*c* 25.0m by *c* 15.0m by 3.0m to 5.0m depth
Existing basement floor level	*c* 2.62m OD
Base of modern slab	*c* 2.0m OD
Depth of archaeological stratigraphy above natural	*c* 6.5m
Level of base of lowest features or deposits observed	*c* -2.6m OD
Top of surviving natural observed at	*c* -2.6m OD
Level of base of trench	*c* -2.6m OD

4.3.1 The existing basement was *c* 25m from north-east to south-west and *c* 15m from north west to south east. The floor surface at *c* 2.62m OD was reduced by 0.70m overall but the western half was subjected to reduction to a similar level as the external area. Modern activity associated with the standing building had truncated the whole sequence down to *c* 2m OD and further localised intrusions related to the pier bases and wall footings went down to *c* -0.40m OD, (i.e. 0.40m below datum).

4.3.2 The lowest deposits were represented by context [67] similar to the external area exhibiting possible silting up/sluggish flow attributed to a less confined early Holocene channel. The remainder of the higher sequence that was revealed showed extensive deposits of alluvial material that matched those contexts seen to the north of channel [61]. These complimented the results seen in the external area to the north of channel [61], albeit with very minor variations in height OD.

4.3.3 The uppermost horizontally surviving archaeological deposit was alluvial context [52], at *c* 2m OD. Truncation at this level was due to the deeper impact of the existing basement level. The only later activity noted consisted of two wells that were cut into the alluvial layers. These were thought to be of 19th-century date and were probably set in the rears of two of the properties that would have fronted onto Lafone Street. One well was c 1m in diameter with a single skin brick lining, context [58] and had been backfilled with concrete up to 1.62m OD presumably during previous remedial works undertaken upon the existing building. Its depth was not established however it descended at least 3m below the basement floor. The second well, context [65], was of a similar date and dimension except that it was of a two brick skin and the backfill was of demolition rubble, up to 2.12m OD.

4.3.4 Overlying all of this was a layer of rubble 0.30m thick which was the bed for the basement floor slab at *c* 2.62m OD. Localised deeper truncations included those for the footings pier bases and drainage of the existing building.

Site Overview

4.3.5 The natural gravels were encountered at c -2.60m OD and were overlain by *c* 6m of archaeological formation. A silted up palaeochannel formed the early part of the sequence and the area appeared to have been periodically flooded between drier phases occurring during the prehistoric period. The site was marginal land until it was probably incorporated within a system of water meadows with an associated drainage channel in the historic period.

4.3.6 The first evidence for building is thought to date to the later 17th or early 18th century. Later post-medieval activity involved the raising and consolidation of the ground level, culminated with the late 18th- and 19th-century development of buildings on the street frontage. Although truncated this evidence is shown on

historic mapping for the site.

4.3.7 Geoarchaeological monolith sampling undertaken at the site recorded prehistoric sediments representing the formation of channel bars and islands used by prehistoric peoples for very short periods. Worked and burnt flint was recorded on the sand and silt banks/mid-channel bars that formed in the less constrained early Holocene tributary valley. This probably represented short-lived activity camps situated in close proximity to the rich resources of the river. During the Roman period the deposit sequence was represented by open grass-lands periodically waterlogged by river flooding. Such conditions would have made Roman occupation highly unlikely at the site in relation to its locations within a low lying channel valley that cut into or bisected the Horsleydown eyot. The upper alluvial sequences representing waterlogging and estuarine inundation of this low lying tributary floodplain up into the historic period.

4.4 The finds

The pottery, glass and clay tobacco pipes - Nigel Jeffries

Category	Description	Weight
Clay pipes	12 fragments including three accessions	
Post-medieval pottery	60 sherds	3.8kg
Post-medieval glass	3 fragments (bulk)	1 kg

Table 1 Finds and environmental archive general summary

4.4.1 This short report reviews the pottery, glass and clay tobacco pipes found in three contexts [38], [49] and [50] in addition to unstratified material. The stratified deposits are dated by the finds to the 17th to mid-18th century with statistical counts provided in Table 1 and a dating summary in Table 2 .

4.4.2 Forty-seven of the sixty sherds of pottery were recovered in [38]. The large proportion of this material was plain glaze (TGW C) and decorated (TGW D, F and H style) London delftware in a number of standard forms (plates, jars and so on) made here in the late 17th to early 18th century. Examples of a few waster sherds dumped from one of the many delftware pothouses located in Southwark include the fused rim sherds of two pale blue glazed rounded bowls decorated in the Chinoserie style (TGW H).

4.4.3 The remaining two contexts with pottery [49] and [50] contained an unusual and well-preserved vessel in each. Five sherds from a Surrey-Hampshire border ware (BORDY) costrel in a bottle shape reconstructs to a complete base and profile. Second the biscuit-fired delftware (TGW BISC) salt retrieved from wet-sieved sample <15> in [50] directly corresponds to the example found during excavations on the Platform Wharf delftware pothouse in Rotherhithe, Southwark which operated *c.* 1638–84 (Tyler, Stephenson and Betts 2008, fig. 134 <P168>, 83).

4.4.4 Glass from stratified contexts was restricted to the two fragments of two mid-18th–century English made bottle types in [38]: the mallet and early cylindrical bottle. The mallet bottle survives as a profile, easily identified by its high domed push up base, distinctive squat body shape and single string bevelled rim finish.

4.4.5 The majority of the clay tobacco pipes (seven bowls and one stem) were found in [38] and include all three accessioned pipes <1>–<3>. They comprise two AO22 (dated *c.*1680–1710) and five AO25 bowl types (*c.*1700–70). Two of the five AO25

bowls present maker's initials, with the first of R/K <1> stamped on the back of the bowl facing the smoker and the second <3>, the relief moulded initials of A/H added to the side of each heel. The one stem <2> bears the similarly positioned initials of H/S. Four earlier dated pipes were found in [49] with the AO15 and AO18 types (both are dated *c.*1660–80) refining the date of this deposit to the third quarter of the 17th century.

Context	TPQ-TAQ
+	
[38]	1700–50
[49]	1660–80
[50]	1630–1700

Table 2 Contexts by terminus post-quem and ante-quem dating

Building Materials - Ian Betts

4.4.6 Two fragments of kiln furniture (or in one case possible peg roofing tile) and a piece of grey slate were recovered from QEL13 (contexts [+] and [37]). The material from QEL13 has been fully recorded and the information added to the Oracle database. Listed below is a summary of the material in each context:

Context	Fabric	Type	Context date (based on date of other finds from the site)
[+]	3067	Kiln shelving	1600–1750
[38]	3067	Kiln shelving? (or peg roofing, fabric 2278)	1700–1750
	3115	Writing slate?	

4.4.7 Found unstratified was a fragment of 'girder' kiln shelving from the manufacture of tin-glazed delftware. Part of the girder has white tin-glazed attached. Similar kiln shelving was used at the Rotherhithe delftware pottery (c 1638–84) (Tyler Stephenson and Betts 2008, 64, Fig 82). Also from the site are a few pottery waster sherds, which like the kiln shelving, were dumped from one of the many delftware pothouses located in Southwark. The closest to the site is that located at Still Stairs (*c* 1663–85) but wasters from the Pickleherring pothouse (*c* 1618–1723) were dumped in Potter's Fields a short distance to the west.

4.4.8 Further possible evidence for delftware production was found in context [38] which produced what may be flat kiln shelving. Alternatively, it could be a north Kent peg roofing tile. A fragment of grey slate in the same context ([38]) is probably a writing slate as both sides have been polished smooth. There is one surviving cut edge and the remains of what appear to be two nail holes, perhaps were string was used to hang-up the slate when not in use.

5 Archaeological potential

5.1 Answering original research aims

5.1.1 The archaeological brief was essentially limited to establishing where archaeological deposits survived (presence/absence), these were recorded where necessary and this also ensured that the proposed groundworks did not involve the destruction of any archaeological deposits of national significance.

5.1.2 The limited nature of the proposed works and the watching brief upon them made it unreasonable to establish many specific archaeological research objectives. Nevertheless a few research questions had been outlined:

- *What is the level and profile of the underlying natural sands and gravels on the remainder of the site?*

5.1.3 The natural gravel was recorded onsite at *c* -2.5m OD generally but does deepen to -3.62m OD in the augerhole in the south- west of Trench 1.

- *Can the edge or limits of the palaeochannel recorded in the evaluation be identified on the site?*

5.1.4 Oblique sections through the later Holocene (later prehistoric to historic) confined channel where recorded during the watching brief and the wider less constrained early Holocene channel valley in the site area may be up to 300m wide. However, considering the minimal spread of sub surface data around the site it the width of the this channel valley as it drains or even bisects Horselydown eyot is likely to be less than 300m.

- *What is the nature of any further alluvial sequences on the site? How do these compare with the deposits recorded during the earlier trench evaluation at the site?*

5.1.5 Basally the sequence recorded prehistoric coarse grained sediments representing the slackening flow after the glacial meltwaters abated and the formation of channel bars and islands used by prehistoric peoples for very short periods. The upper alluvial sequences are predominantly minerogenic and lack significant organic inclusions, representing waterlogging and estuarine inundation of this low lying tributary floodplain up into the historic period. The watching brief sequences align well with previous evaluation sequences.

- *Is there any evidence of prehistoric activity on the site?*

5.1.6 Occasional flint artefacts attributed, most probably, to the Bronze Age period were present; these were scattered within an alluvial deposit that had formed during a drier period in the prehistoric environment. Worked and burnt flint was recorded on the sand and silt banks/mid-channel bars that formed in the less constrained early Holocene tributary valley. This probably represented short-lived activity camps situated in close proximity to the rich resources of the river.

- *Are any further alluvial clay deposits recorded on the site comparable to those recorded to the west recorded at Potters Fields (site code POE04) which represent periods of inundation dating from the Roman period onwards?*

5.1.7 The Roman land surface was recorded between 0.95m OD and 1.28m OD at

Potters Field. At this elevation the deposit sequence at QEL13 represented open grass-lands periodically waterlogged by river flooding. Such conditions would have made Roman occupation highly unlikely at QEL13. The sequences of sands representing fluctuating higher and lower energy fluvial deposition is comparable at both sites but those recorded at POE04 were recorded 1 to 2m higher in elevation than at QEL13 and likely represent the difference of landscape position for POE04 atop Horselydown eyot proper and QEL13 within a low lying channel valley that cut into or bisected the eyot.

- *When did permanent reclamation, occupation and urbanisation begin in this part of Horsleydown?*

5.1.8 Reclamation may have begun at the end of the medieval period and was presumably sufficiently established prior to the first known buildings on the site of the 17th century and culminated within the following century.

- *Is there evidence of previous 17th to 19th-century structures on the remainder of the site as suggested from historic maps?*

5.1.9 The remains of two shallow brick built wall footings of probable 17th century date were identified upon the northern side of the site. Historic maps such as the Morgan map of 1682 (see front cover), suggest the site was at least partially built up by the later 17th century and later mapping (Roque's map of 1746 and Horwood's map of 1799) show properties across the site. On the Queen Elizabeth Street frontage limited survival of structural elements of late 18th- and earlier 19th- century brick built buildings were apparent; these were assumed to have been domestic dwellings. The remnants of two wells were noted beneath the existing basement; these were likely to have stood to the rear of separate properties that would have fronted onto Lafone Street.

- *What are the latest deposits identified?*

5.1.10 The latest surviving deposits were associated with the buildings of nineteenth century period.

- *What is the extent of modern disturbance across the west of the site?*

5.1.11 Extensive disturbance was caused by the formation of a deep multi-branched piped drainage system up to 3m in depth. This greatly disturbed on the central and southern part of the external area. A confluence the drainage branches was outside the north-east corner of the existing basement. Truncation beneath the latter was confined to the structural wall footings, large pier bases and the drainage system.

5.2 Answering new research aims

5.2.1 The results from the watching brief have provided an adequate insight into the archaeological events upon the site and its immediate environs. No further research aims were raised beyond those which were identified in the original Written Scheme of Investigation. However more detailed documentary investigation might provide specific details regarding the origins, uses owners and occupiers of the buildings coupled with the interests in the estate of land.

5.3 Significance of the data

5.3.1 Whilst the archaeological remains are undoubtedly of local significance there is nothing to suggest that they are of regional or national importance. The importance of this watching brief has been to add to the knowledge and understanding of past events in the immediate vicinity and their place in the wider context.

6 Publication and archiving

6.1.1 The results of the watching brief will be made publicly available by means of a database in digital form, to permit inclusion of the site data in any future academic researches into the development of London.

6.1.2 The site archive containing original records and finds will be stored in accordance with the terms of the *Written Scheme of Investigation* (MOLA 2014) with the Museum of London Archaeological Archive within twelve months of the end of the watching brief.

6.1.3 Planning Condition 5 relating to the site states that proposals for post-excavation work and publication of the site will be submitted and approved in writing by the Local Planning Authority. In the case of this site in view of the limited potential of the material (Sections 5) and the relatively limited significance of the data (Section 5.3) it is suggested that the publication requirement would be covered by a short note on the results of the watching brief should appear in the annual round up of the London Archaeologist. This should be undertaken within twelve months of completion of the site.

6.1.4 Geoarcheaologically the deposits recorded on the site show this channel bisecting Horselydown Eyot in the early prehistoric periods and then subsequently filling in, however the poor preservation of organic material from the samples limit further detailed analysis for an individual publication. It is recommended however that geoarchaeological data from the site could be referred to in publication of sites investigated nearby, for example sites investigated for the Thames Tunnel works in relation to the development of the Horselydown Eyot and the river regime of the Thames.

7 Acknowledgements

7.1.1 The author would like to thank the following for their contributions and help in producing this report: Nick Langley (Hollybrook Ltd) for commissioning the project and in particular Peter Wright the Site Manager of Hollybrook Ltd for his support and interest throughout the watching brief. Thanks are also due to Eugen Pancivc the Site Foreman of Modebest for his assistance during the ground work.

7.1.2 The finds were reported upon by Nigel Jeffries and Ian Betts and the geoarchaeological input was provided by Virgil Yendell, all of whom are MOLA staff.

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9 OASIS archaeological report form

OASIS ID: molas1-222067

Project details

Project name	19, Queen Elizabeth Street, Southwark, London, SE1 2LP
Short description of the project	A watching brief upon ground reduction for a new basement. It revealed a heavily truncated post-medieval sequence and beneath that alluvial deposits associated with a paleochannel.
Project dates	Start: 23-02-2015 End: 19-06-2015
Previous/future work	Yes / Not known
Any associated project reference codes	QEL13 - Sitecode
Type of project	Recording project
Site status	Area of Archaeological Importance (AAI)
Current Land use	Residential 1 - General Residential
Monument type	CHANNEL Early Prehistoric
Monument type	BUILDINGS Post Medieval
Significant Finds	POTTERY Medieval
Significant Finds	GLASS Post Medieval
Investigation type	"Watching Brief"
Prompt	Planning condition

Project location

Country	England
Site location	GREATER LONDON SOUTHWARK BERMONDSEY ROTHERHITHE AND SOUTHWARK 19, Queen Elizabeth Street, Southwark, London, SE1 2LP
Postcode	SE1 2LP
Study area	750 Square metres
Site coordinates	TQ 33657 79926 51.501945412856 -0.074110702964 51 30 07 N 000 04 26 W Point
Height OD / Depth	Min: -2.62m Max: -2.62m

Project creators

Name of	MOLA

Organisation	
Project brief originator	MOLA project manager
Project design originator	MOLA
Project director/manager	Simon Davis
Project supervisor	Richard Hewett
Type of sponsor/funding body	Client

Project archives

Physical Archive recipient	LAARC
Physical Contents	"Ceramics","Glass","Industrial","Worked stone/lithics"
Digital Archive recipient	LAARC
Digital Media available	"Images raster / digital photography"
Paper Archive recipient	LAARC
Paper Media available	"Context sheet","Drawing","Plan","Report","Section","Unpublished Text"

Entered by	R Hewett (rhewett@mola.org.uk)
Entered on	28 August 2015

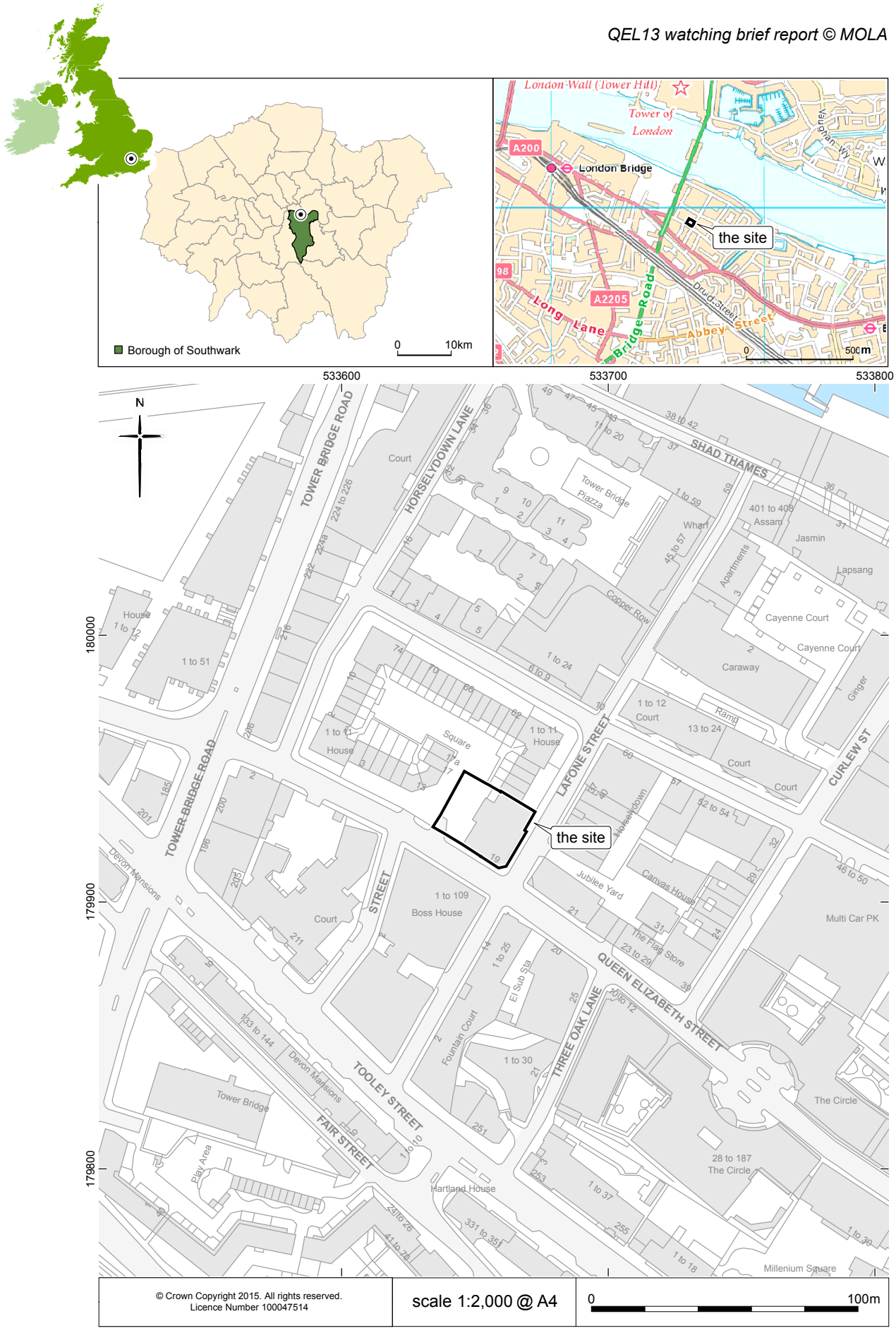

Fig 1 Site location

Fig 2 Area of investigation and location of previous evaluation trench on the site

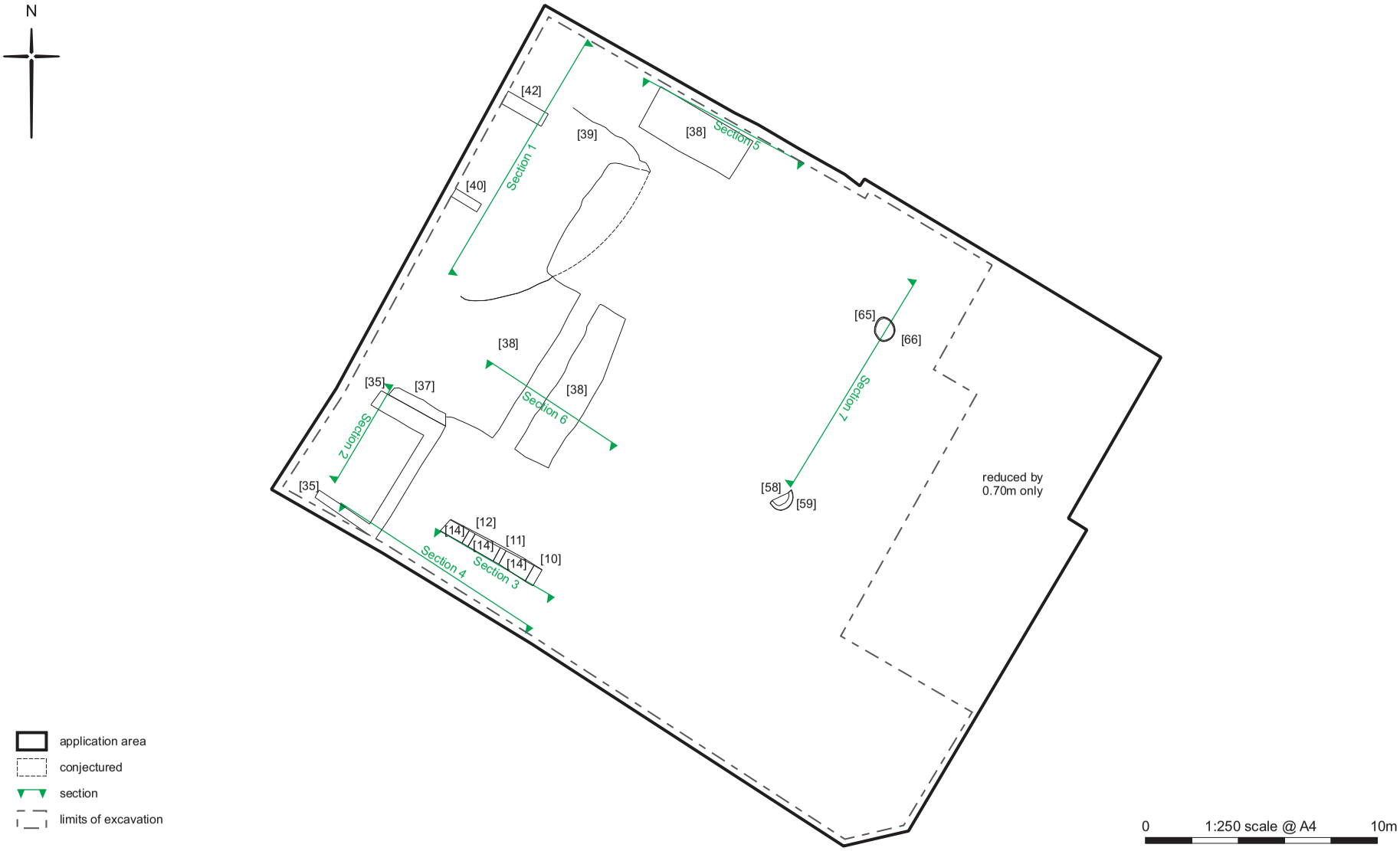

Fig 3 Plan of the post-medieval deposits and locations of sections drawn on the site

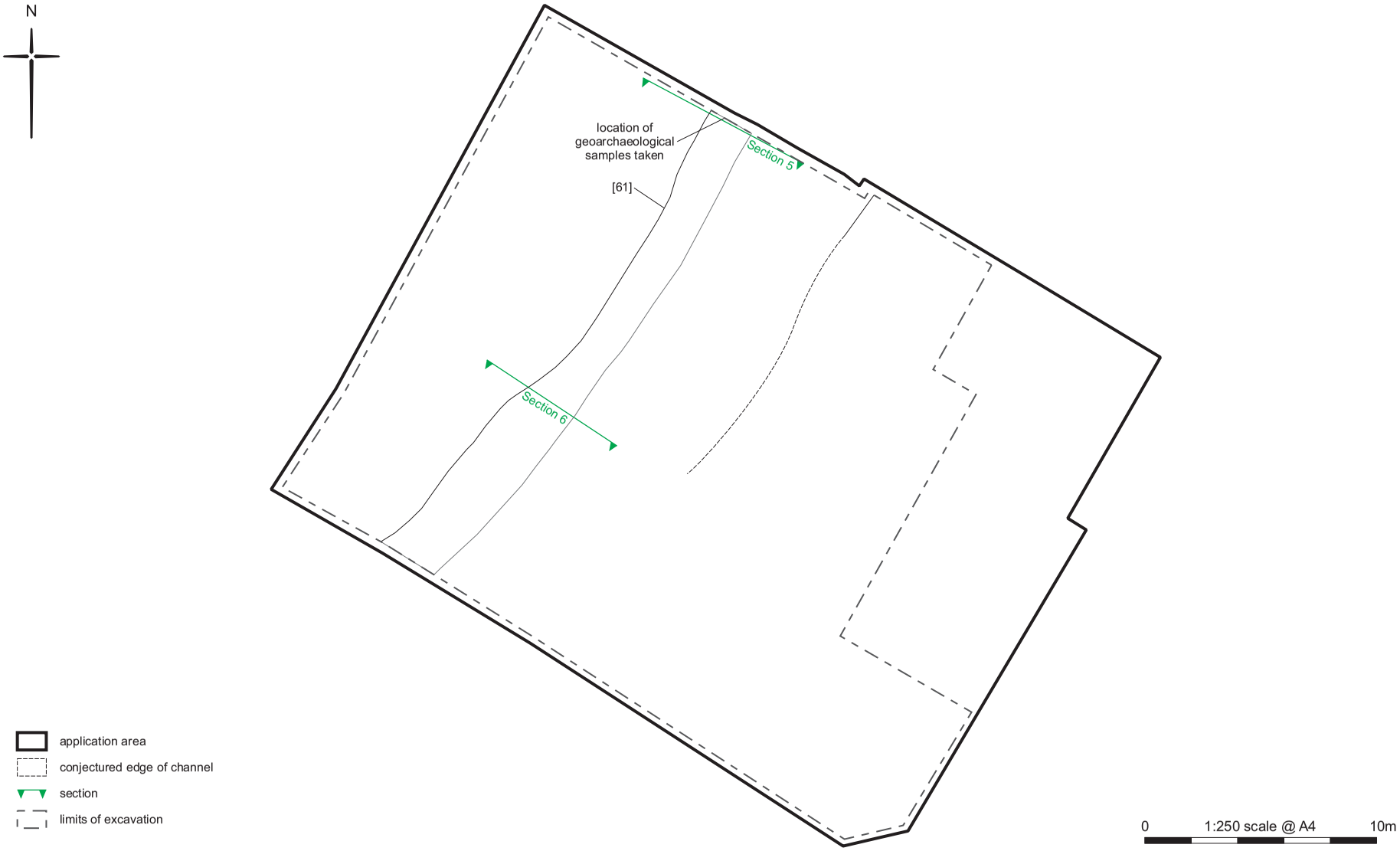

Fig 4 Plan showing western edge of channel [61] and conjectured extent

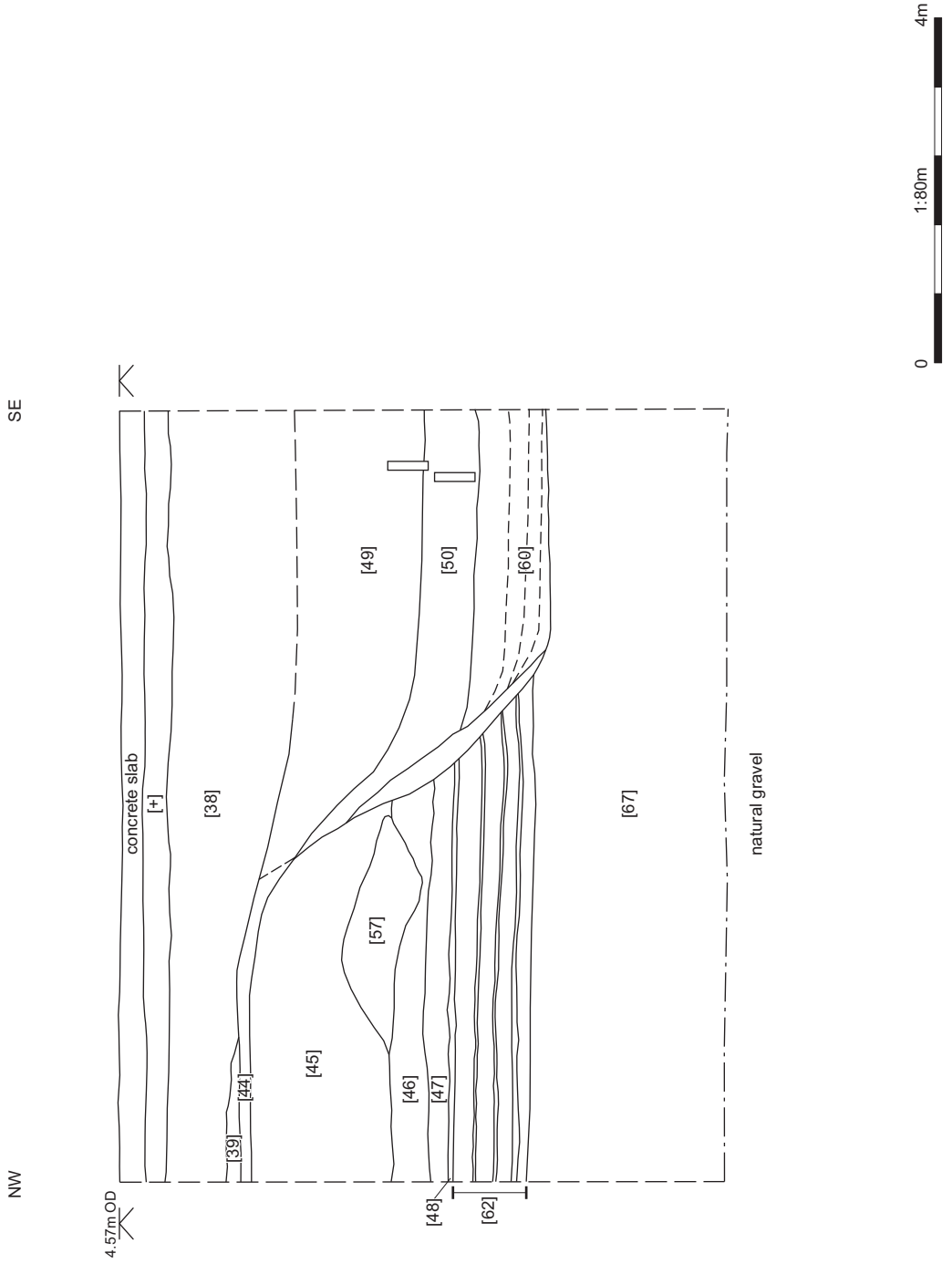

Fig 5 Section 5 showing deposits across the north-east end of the site

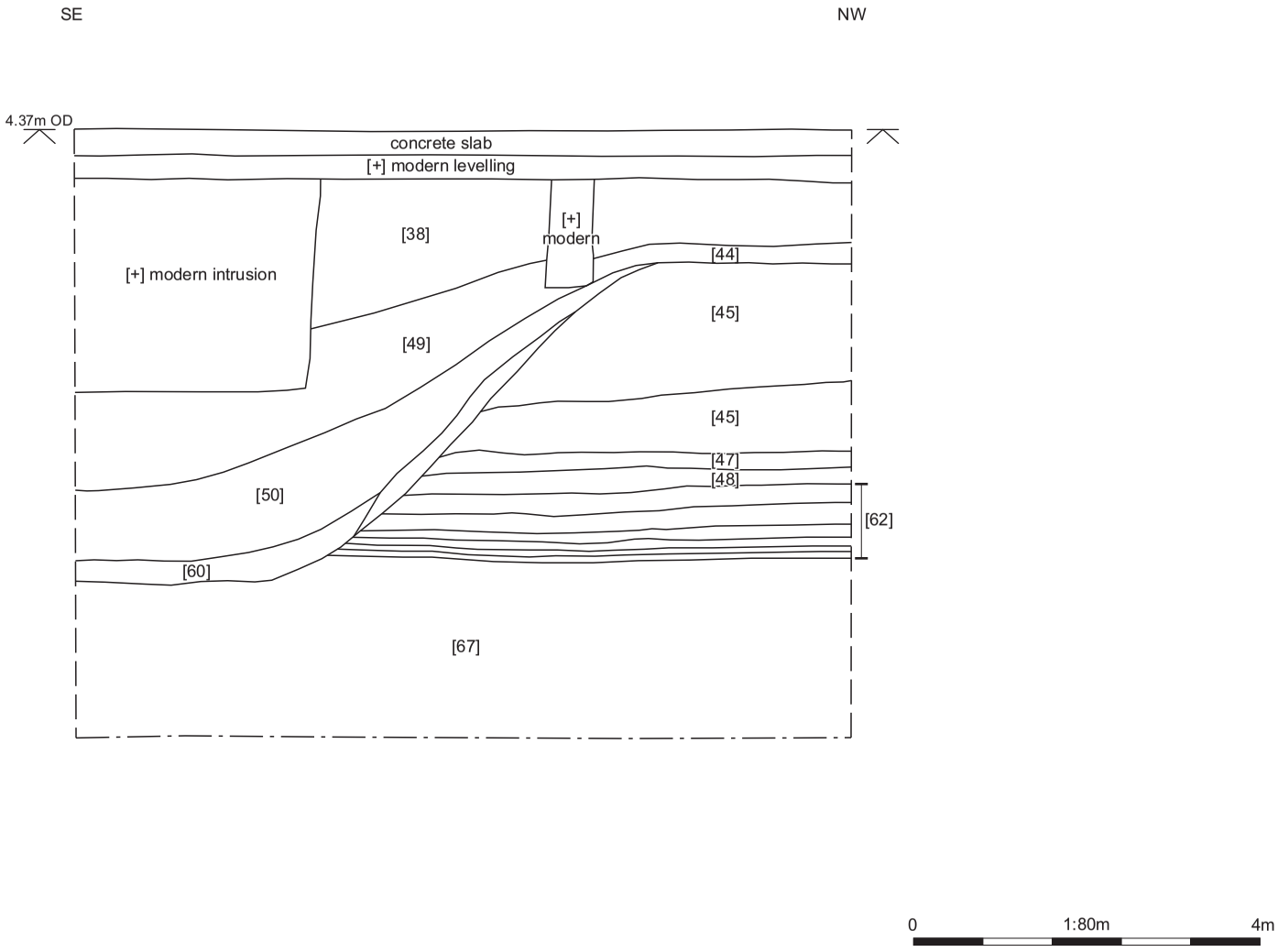

Fig 6 Section 6 showing deposits near the south-west end of the site

Fig 7 Wall [35], looking towards north-west; 20cm scale

Fig 8 Walls [24] and [27] with associated deposits in section looking south-west; 20cm scale

Fig 9 Wall [29], looking south-west; 20cm scale

Fig 10 Walls [11], [16] and [19], associated deposits and floor slabs [22] looking north-east; 20cm scale

Fig 11 Wall footing [40] and mortar layer [39], looking north-west; 20cm scale

Fig 12 Wall footing [42] and mortar layer, [39], looking north-west; 20cm scale

Fig 13 East area of channel [61] with lower fills [50], [60 and [63], looking north-east; 20cm scale

Fig 14 West area of channel [61] in section, looking south-west; a 20cm scale

Fig 15 Detail of layers [46], [47], [48] and [62] looking north-west; 20cm scale

Fig 16 Channel [61] and layers [46], [47] and [48] looking south-west; 20cm scale

Fig 17 Banded formation [67] looking south-west

Fig 18 Exploratory slot through [67] exposing terrace gravels at base, looking south

Fig 19 Layers [54], [55], [56] and [57] looking north

10 Appendix - Geoarchaeological report

19 QUEEN ELIZABETH STREET
London
SE1 2LP

London Borough of Southwark

Report on geoarchaeological monolith assessment

Site code – QEL13

Sign-off History:

Issue No.	Date:	Prepared by:	Checked/ Approved by:	Reason for Issue:
1	29.10.2015	Virgil Yendell	S Davis	Draft for issue

Graphics: Judit Peresztegi

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Illustrations

Tables

11 Introduction

11.1 Site background

11.1.1 The geoarchaeological monolith sampling was undertaken at 19 Queen Elizabeth Street, London, SE1 2LP (hereafter called 'the site') as commissioned from MOLA by Hollybrook Limited. The centre of the site lies at National Grid reference 533657 179926, see Fig 1. Ground level adjacent to the site is *c* 4m above Ordnance Datum (OD). The site includes an early 20th-century four storey building and an open ground-level car park to the west. The standing building has a basement with a finished floor level of *c* 2.1m OD (1.9mbgl).

11.1.2 The consented scheme comprises refurbishment of the existing building and construction of an additional storey over the existing structure. Within the current open car park in the western part of site, it is proposed to construct a new three storey, basemented extension to the existing building. The basement area will include lower ground and sub-basement levels, the lower of which will have a finished floor level of -1.31m OD or *c* 5.80m below ground level.

11.1.3 As detailed in the main body of the watching brief report, on 18th June 2015 an application was granted to vary the consented scheme (13/AP/2405) under planning application reference 15/AP/1236 (and also included Conditions 4 and 5 pursuant to archaeology).

11.1.4 Details of the consented development are available at http://planningonline.southwark.gov.uk/

11.1.5 The works requiring a watching brief have been adequately summarised in the main report within this document and are not repeated here.

11.2 Origin and scope of the report

11.2.1 The origin and scope of the archaeological works have been adequately summarised in the main report within this document and are not repeated here.

11.3 Aims and objectives

11.3.1 The primary objective of the geoarchaeological assessment is to confirm the extent, nature and significance of any surviving geoarchaeological deposits or remains in the site.

11.3.2 The assessment of significance of any surviving remains is undertaken in the context of the wider archaeological research priorities for London. These are set out in the Museum of London's 'A research framework for Greater London' (MOL, 2002).

11.3.3 A number of broad objectives and research questions have been identified:

- What is the level and profile of the underlying natural sands and gravels on the remainder of the site?
- Can the edge or limits of the palaeochannel recorded in the evaluation be identified on the site?

- What is the nature of any further alluvial sequences on the site? How do these compare with the deposits recorded during the earlier trench evaluation at the site?
- Is there any evidence of prehistoric activity on the site?
- Are any further alluvial clay deposits recorded on the site comparable to those recorded to the west recorded at Potters Fields (site code POE94) which represent periods of inundation dating from the Roman period onwards?
- When did permanent reclamation, occupation and urbanisation begin in this part of Horsleydown?
- Is there evidence of previous 17th to 19th-century structures on the remainder of the site as suggested from historic maps?
- What are the latest deposits identified?
- What is the extent of modern disturbance across the west of the site?

12 Methodology

12.1 On-site

12.1.1 All geoarchaeological on-site sampling and off-site work during fieldwork was carried out in accordance with standard geoarchaeological practice and where appropriate the MOLA Archaeological Site Manual (MoL 1994). On site, monolith tins were placed vertically into the side of sections exposed during the excavation to retrieve continuous stratigraphic samples. The number of tins used was dependent upon the depth and/or significance of the stratigraphic sequence and the suitability of the stratigraphy for sampling. Each monolith tin was plotted on the section drawing and related to Ordinance Datum (OD). The monolith tins were then sealed and together with the bulk samples were transported to the MOLA environmental laboratories where the sediments were recorded. All the monolith samples were cleaned and described, using standard sedimentary criteria, as outlined in Jones et al (1999). This attempts to characterise the visible properties of each deposit, in particular relating to its colour, compaction, texture, structure, bedding, inclusions and clast-size. For each profile the depth and nature of the contacts between adjacent distinct units was noted.

12.2 Off-site

12.2.1 The samples from the evaluation were retained and taken to the geoarchaeological MOLA laboratory, cleaned and recorded according to standard sedimentary criteria.

12.2.2 The preservation and potential of environmental remains within the samples were assessed by sub-sampling the sequences for a range of environmental indicators (pollen, ostracods and diatoms). Where possible blocks of sediment from selected key deposit locations were wet sieved over a 0.25mm mesh for macrofossils (e.g. seeds, snails, molluscs and insects); and sub-samples submitted to external specialists for the assessment of microfossils (e.g. pollen ostracods and diatoms).

12.2.1 In order to create the deposit model the data points were entered into a digital (Rockworks 15) database. The distribution of the data is illustrated on Fig 2.

12.2.2 The point data set was exported into Arc GIS v10.1. By utilising the Spatial Analyst module, digital elevation models (DEMs). These highlight major features of the topography through time; for example, incised channels and gravel high points. For this report the surface plots calculated were:

12.2.3 Early Holocene surface (Fig 6): This gives an approximation of the topography of the site as it existed at the beginning of the early Mesolithic period c 10,000 years ago. The development of the Holocene floodplain is likely to have been influenced by the gravel and sand topography inherited from the Pleistocene/Late glacial period. This surface would have dictated the course of later channels, with gravel high points forming areas of dry land within the wetlands, and lower lying areas forming the main threads of later channels.

12.2.4 By examining the surface plots in combination with the vertical deposit succession, professional judgement has been used to define areas of varying levels of geoarchaeological and archaeological potential (e.g. high areas of gravel topography, channels and marginal wetlands).

12.2.5 The combined information on the buried topography, distribution and sequence of deposits surviving across the site and the preservation of environmental remains in the samples were used to reconstruct the past environments represented and to assess the potential for past landscape reconstruction of the samples recovered from the site.

12.2.6 This report summarising the results; illustrating the location of the samples within schematic sections (Fig 3 to Fig 5); identifying their potential for past landscape reconstruction; and recommending a proposal for any further analysis that might be appropriate.

13 Results

13.1 Stratigraphy

Three sampled sequences were assessed; Section 1 from the evaluation (MOLA 2013b and Fig 3) and sections 5 and 6 from the watching brief (Fig 4 and Fig 5). For intervention and data point locations see Fig 2. The lithostratigraphy recorded in sequences is presented in the tables below.

Table 3 Log of Section 1: South facing section of Evaluation Trench 1, west end (data point reference QEL13_s1_Tr1_w)

QEL13_s1_Tr1_w						
National grid reference					533649.2	179940.6
Context	**Top (m BGL)**	**Base (m BGL)**	**Top (m OD)**	**Base (m OD)**	**Description**	**Interpretation**
4	1.60	2.76	**2.95**	**1.79**	Firm light yellowish brown slightly silty clay with rare mollusc fragments, rare charcoal flecks and rare rounded medium gravel clasts.	Facies 3: Historic silting up of channel or overbank sedimentation of near channel area. Semi- terrestrial weathered alluvial deposit with anthropogenic inclusions/disturbance. Silting up of the later constrained channel (CH4).
7	2.76	3.06	**1.79**	**1.49**	Soft sticky light brownish grey slightly clayey silt with frequent patches of Fe staining	Facies 2: Late Glacial to early Holocene semi-terrestrial weathered alluvial deposit formed as silting up of channel or overbank sedimentation of near channel area. Deposition in the earlier channel (CH3) as flow rate slackens.
6	3.06	3.64	**1.49**	**0.91**	Soft dark blue grey silt with lenses of fine sand with some evidence of Fe stained root channel and rare fine plant fibres	Facies 2: Late Glacial to early Holocene semi-terrestrial alluvial deposit with evidence of vegetation and higher energy river action/flood events. Deposition

						in the earlier channel (CH3) as flow rate slackens.

Table 4 Log of Section 1: South facing section of Evaluation Trench 1, east end (data point reference QEL13_s1_Tr1_e)

QEL13_s1_Tr1_e						
National grid reference					533650.2	179938.9
Context	**Top (m BGL)**	**Base (m BGL)**	**Top (m OD)**	**Base (m OD)**	**Description**	**Interpretation**
4	1.60	3.01	**2.95**	**1.54**	Firm light yellowish brown slightly silty clay with rare mollusc fragments, rare charcoal flecks and rare rounded medium gravel clasts.	Facies 3: Historic silting up of channel or overbank sedimentation of near channel area. Semi- terrestrial weathered alluvial deposit with anthropogenic inclusions/disturbance. Silting up of the later constrained channel (CH4).
5	3.01	3.05	**1.54**	**1.50**	Firm mid yellowish brown silty clay with moderate Fe stained root channels	Facies 2: Semi-terrestrial alluvial deposit with evidence of vegetation. Deposition in the earlier channel (CH3) as flow rate slackens.
7	3.05	3.21	**1.50**	**1.34**	Soft sticky light brownish grey slightly clayey silt with frequent patches of Fe staining	Facies 2: Late Glacial to early Holocene semi-terrestrial weathered alluvial deposit formed as silting up of channel or overbank sedimentation of near channel area. Deposition in the earlier channel (CH3) as flow rate slackens.
6	3.21	3.64	**1.34**	**0.91**	Soft dark blue grey silt with lenses of fine sand with some evidence of Fe stained root channel and rare fine plant fibres	Facies 2: Late Glacial to early Holocene semi-terrestrial alluvial deposit with evidence of vegetation and higher energy river action/flood

						events. Deposition in the earlier channel (CH3) as flow rate slackens.

Table 5 Log of AH1: Evaluation Trench 1 south-west corner (data point reference QEL13_AH1_Tr1_sw)

QEL13_AH1_Tr1_sw						
National grid reference					533646.4	179937.8
Context	**Top (m BGL)**	**Base (m BGL)**	**Top (m OD)**	**Base (m OD)**	**Description**	**Interpretation**
1.1O	0.00	0.50	**1.33**	**0.83**	Firm dark blue grey clay with rare rooting and plant fibres	Facies 2: Late Glacial to early Holocene semi-terrestrial alluvial deposit with evidence of vegetation and higher energy river action/flood events. Deposition in the earlier channel (CH3) as flow rate slackens.
1.9	0.50	0.57	**0.83**	**0.76**	Soft light greyish brown medium to coarse sandy silt	Facies 2: Late Glacial to early Holocene higher energy mid-channel deposit. Deposition in the earlier channel (CH3) as flow rate slackens.
1.8	0.57	0.95	**0.76**	**0.38**	Light greyish yellow medium clay sand	
1.7	0.95	1.30	**0.38**	**0.03**	Light orange grey firm fine sandy silt	
1.6	1.30	1.40	**0.03**	**-0.07**	Light grey orange sandy silt	
1.5	1.40	2.00	**-0.07**	**-0.67**	Soft light orangey grey silty fine sand	
1.4	1.00	2.80	**0.33**	**-1.47**	Void	
1.3	2.80	4.00	**-1.47**	**-2.67**	Soft mid yellowish orange slightly silty fine to medium sand becoming coarse from 3.10m bgl increasing coarse fraction and becoming stony with depth	
1.2	4.00	4.95	**-2.67**	**-3.62**	Void	
1.1	4.95	6.00	**-3.62**	**-4.67**	Wet compacted mid orange brown medium to coarse sand with	Facies 1: Pleistocene gravels

					abundant fine to medium gravels	

Table 6 Log of Section 5: South-east facing section of Watching Brief, north-west end (data point reference QEL13_s5_WB_nw)

QEL13_s5_WB_nw						
National grid reference					533648.3	179947.4
Context	**Top (m BGL)**	**Base (m BGL)**	**Top (m OD)**	**Base (m OD)**	**Description**	**Interpretation**
+	0	0.5	**4.57**	**4.07**	Concrete slab	Madeground
38	0.5	1.2	**4.07**	**3.37**	Dark greyish brown mixed clayey and sandy silt, occasional pot and clay pipe, very occasional bone, glass	Madeground
39	1.2	1.4	**3.37**	**3.17**	loose off white crushed mortar and brick fragments	Madeground
44	1.4	1.5	**3.17**	**3.07**	Firm dark greyish brown, Fe staining, clayey silt	Facies 2: Early to mid-Holocene semi-terrestrial alluvial deposit with evidence of vegetation and higher energy river action/flood events. Deposition in the earlier channel (CH1) as flow rate slackens.
45	1.5	3.15	**3.07**	**1.42**	Firm light yellowish brown silty clay, occasional sand and pebble	
46	3.15	3.6	**1.42**	**0.97**	Soft mid to dark bluish grey some Fe staining sandy silt, occasional organic flecks	
47	3.6	3.8	**0.97**	**0.77**	Firm mottled brownish grey with Fe staining, silty sand, very occasional struck flint and burnt flint	Facies 2: River action/flood events possibly attributed to a less confined early Holocene (CH1) channel which may have formed a bank or mid channel bar used as an activity camp by prehistoric peoples.
48	3.8	3.85	**0.77**	**0.72**	Soft yellow orange sand	Facies 2: River action/flood events possibly attributed to a less confined early Holocene (CH1) channel
62	3.85	4.65	**0.72**	**-0.08**	Light to mid grey banded silts and sands, occasional organic matter	Facies 2: Silting up/sluggish flow possibly attributed to a less confined early Holocene (CH1) channel
67	4.65	7	**-0.08**	**-2.43**	Banded yellow and light brown sands and silts to clayey silts	

NAT	7	7.5	**-2.43**	**-2.93**	Wet gravel	Facies 1: Pleistocene gravels

Table 7 Log of Section 5: South-east facing section of Watching Brief, south-east end (data point reference QEL13_s5_WB_se)

QEL13_s5_WB_se						
National grid reference					533656.8	179942.7
Context	**Top (m BGL)**	**Base (m BGL)**	**Top (m OD)**	**Base (m OD)**	**Description**	**Interpretation**
+	0	0.5	**4.57**	**4.07**	Concrete slab	Madeground
38	0.5	2	**4.07**	**2.57**	Dark greyish brown mixed clayey and sandy silt, occasional pot and clay pipe, very occasional bone, glass	Madeground
49	2	3.4	**2.57**	**1.17**	Firm dark brown to brownish grey sandy to clayey silt, occasional pot and clay pipe fragments	Facies 3: Anthropogenic dumping and silting up/sluggish flow within a confined historic channel (CH2)
50	3.4	4.1	**1.17**	**0.47**	Soft mid grey to dark bluish grey, clayey silt, moderate water snails and flecks of organic matter	Facies 3: Silting up/sluggish flow and vegetation encroachment possibly attributed to a confined historic channel (CH2)
60	4.1	5	**0.47**	**-0.43**	Soft light to mid grey sand, occasional organic matter	
67	5	7	**-0.43**	**-2.43**	Banded yellow and light brown sands and silts to clayey silts	Facies 2: Silting up/sluggish flow possibly attributed to a less confined early Holocene channel (CH1)
NAT	7	7.5	**-2.43**	**-2.93**	Wet gravel	Facies 1: Pleistocene gravels

Table 8 Log of Section 6: North-east facing section of Watching Brief, north-west end (data point reference QEL13_s6_WB_nw)

QEL13_s6_WB_nw						
National grid reference					533649.9	179929.8
Context	**Top (m BGL)**	**Base (m BGL)**	**Top (m OD)**	**Base (m OD)**	**Description**	**Interpretation**
+	0	0.57	**4.57**	**4.00**	Concrete slab	Madeground
38	0.57	1.37	**4.00**	**3.20**	Dark greyish brown mixed clayey and sandy silt, occasional pot and clay pipe, very occasional bone,	Madeground

					glass	
44	1.37	1.57	**3.20**	**3.00**	Firm dark greyish brown, Fe staining, clayey silt	Facies 2: Early to mid-Holocene semi-terrestrial alluvial deposit with evidence of vegetation and higher energy river action/flood events. Deposition in the earlier channel (CH1) as flow rate slackens.
45	1.57	3.17	**3.00**	**1.40**	Firm light yellowish brown silty clay, occasional sand and pebble	
46	3.17	3.77	**1.40**	**0.80**	Soft mid to dark bluish grey some Fe staining sandy silt, occasional organic flecks	
47	3.77	3.97	**0.80**	**0.60**	Firm mottled brownish grey with Fe staining, silty sand, very occasional struck flint and burnt flint	Facies 2: River action/flood events possibly attributed to a less confined early Holocene (CH1) channel forming a bank or mid channel bar possibly used as an activity camp by past peoples once deposited
48	3.97	4.27	**0.60**	**0.30**	Soft yellow orange sand	Facies 2: Moderate river energy possibly attributed to a less confined early Holocene (CH1) channel
62	4.27	5.07	**0.30**	**-0.50**	Light to mid grey banded silts and sands, occasional organic matter	Facies 2: Silting up/sluggish flow possibly attributed to a less confined early Holocene (CH1) channel
67	5.07	7.07	**-0.50**	**-2.50**	Banded yellow and light brown sands and silts to clayey silts	
NAT	7.07	7.57	**-2.50**	**-3.00**	Gravel	Facies 1: Pleistocene gravels

Table 9 Log of Section 6: North -east facing section of Watching Brief, south-east end (data point reference QEL13_s5_WB_se)

QEL13_s6_WB_se						
National grid reference					533645.6	179921.8
Context	**Top (m BGL)**	**Base (m BGL)**	**Top (m OD)**	**Base (m OD)**	**Description**	**Interpretation**
+	0	0.57	**4.57**	**4.00**	Concrete slab	Madeground
38	0.57	2.32	**4.00**	**2.25**	Dark greyish brown mixed clayey and sandy silt, occasional pot and clay pipe, very occasional bone, glass	Madeground
49	2.32	3.97	**2.25**	**0.60**	Firm dark brown to brownish grey sandy	Facies 3: Anthropogenic

					to clayey silt, occasional pot and clay pipe fragments	dumping and silting up/sluggish flow within a confined historic channel (CH2)
50	3.97	4.97	**0.60**	**-0.40**	Soft mid grey to dark bluish grey, clayey silt, moderate water snails and flecks of organic matter	Facies 3: Silting up/sluggish flow and vegetation encroachment possibly attributed to a confined historic channel (CH2)
60	4.97	5.22	**-0.40**	**-0.65**	Soft light to mid grey sand, occasional organic matter	
67	5.22	7.07	**-0.65**	**-2.50**	Banded yellow and light brown sands and silts to clayey silts	Facies 2: Silting up/sluggish flow possibly attributed to a less confined early Holocene channel (CH1)
NAT	7.07	7.57	**-2.50**	**-3.00**	Gravel	Facies 1: Pleistocene gravels

13.2 Diatoms

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13.2.1 Introduction

13.2.2 A diatom assessment has been carried out for twelve samples taken from sediment sequences at the Queen Elizabeth Street (QEL13) site. Some of the sediment sequences may have been taken through related channel fills. An indication of which sequences may be related to one another is indicated by their order in Table 1. (Virgil Yendell, pers. comm.)

13.2.3 The diatom assessment of these sequences evaluates the presence or absence of diatoms and the potential of the sediments for further diatom analysis. The diatom assessment of each sample takes into account the numbers of diatoms, the state of preservation of the diatom assemblages, species diversity and diatom species environmental preferences.

13.2.4 Methods

13.2.5 Diatom preparation followed standard techniques (Battarbee *et al.* 2001). Two coverslips were made from each sample and fixed in Naphrax for diatom microscopy. A large area of the coverslips on each slide was scanned for diatoms at magnifications of x400 and x1000 under phase contrast illumination. The details of the samples assessed for diatoms are shown in Table 8.

13.2.6 Diatom floras and taxonomic publications were consulted to assist with diatom identification; these include Hendey (1964), Werff & Huls (1957-1974), Hartley et al. (1996), Krammer & Lange-Bertalot (1986-1991) and Witkowski *et al.* (2000). Diatom species' salinity preferences are indicated using the halobian groups of Hustedt (1953, 1957: 199), these salinity groups are summarised as follows:

1. Polyhalobian: >30 g l-1

2. Mesohalobian: 0.2-30 g l-1

3. Oligohalobian - Halophilous: optimum in slightly brackish water

4. Oligohalobian - Indifferent: optimum in freshwater but tolerant of slightly brackish water

5. Halophobous: exclusively freshwater

6. Unknown: taxa of unknown salinity preference.

Monolith Elevation	Monolith / Section / Trench	Height (m OD)		Depth (m bgl)		Sample Code	Context	Deposit Description	Interpretation
		Top	Base	Top	Base				
Evaluation Section 1 west end, fill of CH3 the early Holocene channel (CH3 likely forms the same channel as CH1)									
1.75	1 / 1 west / 1	1.66	1.65	0.09	0.10	D2	7	Eval trench: Soft sticky light brownish grey slightly clayey silt with frequent patches of Fe staining	Possible vegetated alluvial deposit subsequently eroded by later channel/floodplain (CH4)
1.75	1 / 1 west / 1	1.26	1.25	0.49	0.50	D1	6	Eval trench: Soft dark blue grey silt with lenses of fine sand, some evidence of Fe stained root channel and rare fine plant fibres	Possible alluvial deposit with signs of river action/flood events possibly attributed to a less confined early Holocene channel (CH3)
Watching Brief Section 6 north-west end, fill of CH1 the early Holocene channel (CH1 likely forms the same channel as CH3)									
0.80	14 / 6 / WB	0.77	0.76	0.03	0.04	D12	47	Watching brief: pale brown/yellow grey sand, fine	River action/flood events possibly attributed to a less confined early Holocene (CH1) channel
0.80	14 / 6 / WB	0.61	0.60	0.19	0.20	D11	48	Watching brief: olive grey silt slightly sandy	Sluggish flow possibly attributed to a less confined early Holocene (CH1) channel
Watching Brief Section 5 north-west end, fill of CH1 the early Holocene channel (CH1 likely forms the same channel as CH3)									
0.55	13 / 5 north-west / WB	0.36	0.35	0.19	0.20	D10	62	Watching brief: Brown clay, sandy to upper surface	Silting up/sluggish flow possibly attributed to a less confined early Holocene (CH1) channel
0.55	13 / 5 north-west / WB	0.16	0.15	0.39	0.40	D9	62	Watching brief: Yellow brown grey silty sand	River action/flood events possibly attributed to a less confined early Holocene (CH1) channel
Evaluation Section 1 east end, fill of CH4 later Holocene channel (CH4 is possibly related to CH2)									
2.83	6 / 1 east / 1	2.79	2.78	0.04	0.05	D4	4	Eval trench: Firm light yellowish brown slightly silty clay with rare mollusc fragments, rare charcoal flecks and rare rounded medium gravel clasts.	Grading up into a more widespread alluvial deposit

1.81	3 / 1 east / 1	1.63	1.62	0.18	0.19	P3	4		Silting up of later channel/floodplain (CH4)
Watching Brief Section 5 south-east end, fill of CH2 a later channel (CH2 is possibly related to CH4)									
1.50	11 / 5 south-east / WB	1.39	1.38	0.11	0.12	P8	49	Watching brief: blue grey silty clay	Silting up/sluggish flow infilling later channel (CH2) cutting into earlier channel (CH1) sequence
1.50	11 / 5 south-east / WB	1.17	1.16	0.33	0.34	P7	50	Watching brief: greenish grey silty clay	
1.00	12 / 5 south-east / WB	0.91	0.90	0.09	0.10	P6	50	Watching brief: greenish grey silty clay	
1.00	12 / 5 south-east / WB	0.56	0.55	0.44	0.45	P5	50	Watching brief: sand lens within greenish grey silty clay	River action/flood events of latter channel (CH2) cutting into earlier (CH1) sequence

Table 10 QEL13 samples assessed for diatoms

13.2.7 Results & Discussion

13.2.8 The results of the diatom evaluation are summarised in Table 14 and diatom species data are presented in Table 13 in the appendix.

Diatom Sample Code	Diatoms	Diatom Numbers	Quality of Preservation	Diversity	Assemblage type	Potential for % count
D1	+	ex low	ex poor	v low	bk mar	none
D2	-	-	-	-	-	none
D3	+	ex low	ex poor	v low	? bk ?mar	none
D4	+	v low	v poor	v low	bk fw mar	low
D5	+	v low	v poor	v low	bk fw hal	v low
D6	+	mod	mod to poor	mod	bk fw hal	mod
D7	+	v low	v poor	low	bk mar fw	low
D8	+	v low	v poor	low	bk mar fw	v low
D9	-	-	-	-	-	none
D10	-	-	-	-	-	none
D11	-	-	-	-	-	none
D12	+	ex low	ex poor	1 frag	?bk	none

Table 9 Summary of diatom evaluation results for Queen Elizabeth Street (QEL13) site (+ diatoms present; - diatoms absent; ex extremely; mod moderate; fw freshwater; hal halophilous; bk brackish; aero aerophilous; est estuarine; mar marine; frag fragment).

13.2.9 Diatoms are present in eight of the twelve samples assessed for diatoms from the Queen Elizabeth Street (QEL13) site.

13.2.10 Diatoms are absent from sample D2 and are very poorly preserved in sample D1. The diatoms present in D1 represent benthic, brackish water habitats (Nitzschia navicularis) and the planktonic marine habitat (Paralia sulcata). Neither sample D1 or D2 has further potential for diatom analysis. The geoarchaeological interpretation of these samples suggests that D1 is from an alluvial deposit possibly from a less confined early Holocene channel (CH3). Sample D2 is associated with an alluvial deposit cut by a later channel/floodplain (CH4)

13.2.11 Diatoms are present in both samples D3 and D4, however, diatom numbers are extremely low or very low and the quality of diatom preservation is very poor. D3 has no further potential for diatom analysis, and D4 has low potential for further analysis. The diatom fragments present in D3 may be derived from brackish water or marine taxa, however this is uncertain. The diatom assemblage of sample D4 is comprised of a mixture of brackish, freshwater and marine species. These include the marine plankton Paralia sulcata and Pseudopodosira westii and most abundant is the estuarine plankton species Cyclotella striata and possibly Thalassiosira bramaputrae. Common freshwater diatoms in D4 are the epiphyte Cocconeis placentula and Opephora martyii.

13.2.12 Sample D5 has a very low number of diatoms and the assemblage is very poorly preserved; there is no further potential for diatom analysis of sample D5. Sample D6 contains a moderate number of diatoms. Both samples have diatom assemblages comprised of mixtures of diatom taxa from estuarine (Cyclotella striata, Actinocyclus normanii) and freshwater (Cocconeis placentula, Opephora martyii) habitats. Both assemblages are indicative of an estuarine environment. Allochthonous marine plankton is absent from D5 and D6, however, benthic mesohalobous taxa such as Navicula salinarum and Nitzschia navicularis present in D6 are also indicative of an estuarine environment. Both samples D5 and D6 also contain halophilous diatoms

such as the planktonic Cyclotella meneghiniana; aerophilous diatoms Navicula mutica and Navicula cincta (in sample D6), and non-planktonic halophiles such as Rhoicosphaenia curvata and Surirella brebissonii. Geoarchaeological interpretation of both sediments suggests they are derived from infilling of a later channel (CH2) that cuts into the earlier (CH1 sequence).

13.2.13 Samples D7 and D8 were also taken from deposits interpreted as being derived from the infilling of a later channel (CH2) that cuts into the earlier (CH1 sequence). Again for samples D7 and D8 diatom numbers are very low and the quality of diatom preservation is very poor. There is low or very low potential to carry out percentage diatom analysis on these samples, both contain estuarine diatom assemblages that are composed of a mixture of brackish, marine and freshwater diatoms. Polyhalobous diatoms in D7 and D8 are represented by the coastal plankton species Paralia sulcata. Mesohalobous diatoms include the planktonic species Cyclotella striata and the benthic species Nitzschia navicularis. The most common freshwater diatoms are Cocconeis placentula and Opephora martyii.

13.2.14 Diatoms are absent from samples D9, D10 and D11. All three samples are associated with CH1, possibly attributed to a less confined early Holocene channel (see Table 1). Sample D12 is also from the CH1 deposits according to the preliminary geoarchaeological interpretation. A single fragment, probably derived from the estuarine diatom Cyclotella striata, was identified in the assessment. There is no further potential for diatom analysis of samples D9-D12.

13.2.15 Conclusions

13.2.16 Twelve samples from the Queen Elizabeth Street (QEL13) site have been prepared and assessed for diatoms. Diatoms are present in eight samples and are absent from four samples.

13.2.17 Overall the quality of diatom preservation in the QEL13 sediment sequences is poor or very poor. The diatom assemblage in only one sample (D6) has potential to carry out percentage diatom analysis. Six samples (D1-D3, D9-D12) from the QEL13 site have no further potential for diatom analysis. Four samples (D4, D5, D7, and D8) have low or very low potential for percentage diatom analysis.

13.2.18 The assemblages of six of the diatomaceous samples are indicative of at least some degree of estuarine influence, containing estuarine plankton, benthic mesohalobous diatoms, allochthonous marine species, or halophilous taxa associated with high salinity environments. The extremely poorly preserved diatoms in samples D3 and D12 are also likely to be derived from estuarine environments.

13.2.19 The diatom samples were taken from four probable channel sequences. Samples D9, D10, D11and D12 are from CH1, a less confined early Holocene channel. Diatoms are absent from samples D9-D11 and the diatom evidence for estuarine conditions is weak in D12, which may record flood events (Table 1)

13.2.20 Samples D5-D8 are from CH2 a later channel cutting into the earlier channel (CH1) sequence. As indicated above all four samples reflect tidal environments. The best preserved diatom assemblage here is from sample D6 that was probably formed during silting up of the channel whilst the rate of flow was slow (Table 1)

13.2.21 Sample D1 is from a less confined early Holocene channel, CH3. The diatom assemblage is of estuarine and marine diatoms, however, the quality of diatom preservation is extremely poor.

13.2.22 Samples D2 and D3 are from a later channel or floodplain deposit, CH4. Again diatoms are absent (D2) or the quality of diatom preservation is extremely poor (D3). Sample D4, lying above D3, is not attributed to a channel deposit, but grades into a more widespread alluvial deposit. The diatom assemblage of sample D4 reflects estuarine conditions.

13.3 Pollen

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13.3.1 Introduction

13.3.2 Pollen sediment sub-samples have been analysed from a series of river palaeo-channel fills. The principal aims of the assessment were to:

- check for the presence of sub-fossil pollen.
- If pollen was found, to provide some indication of the range of taxa present.
- If possible to provide some conclusions as to the palaeoenvironment represented including evidence for human activity and,
- to suggest the level to which further analyses could expand our knowledge of the palaeoecology of this area of London.

13.3.3 Pollen preservation was found to be poor or absent in some case. However, some useful palaeoenvironmental data has been obtained and is discussed in this report.

13.3.4 Methods

13.3.5 The sample numbers and details of the samples assessed for pollen are shown in Table 10.

13.3.6 Pollen analysis was carried out on twelve sub-samples taken from the sediment fills of four palaeochannels. Chemical preparation was carried out in the Department of Geography and Environment, University of Southampton. Standard procedures (Moore and Webb 1978; Moore et al. 1991) were used for the extraction of the sub-fossil pollen and spores. This included K.O.H. deflocculation, sieving for removal of coarse debris; micro-mesh sieving (at 10 micron) for removal of the clay and fine silt fraction; HF digestion of silica and Erdtman's acetolysis for removal of cellulose material. The concentrated pollen was stained with safranin and mounted on microscope slides in glycerol jelly. The pollen and spores were identified and counted using an Olympus biological research microscope with phase contrast facility. A sum of 100-200 grains of dry-land taxa plus autochthonous wetland taxa, spores and miscellaneous taxa (pre-Quaternary palynomorphs) was counted for each sample

Monolith Elevation	Monolith / Section / Trench	Height (m OD)		Depth (m bgl)		Sample Code	Context	Deposit Description	Interpretation
		Top	Base	Top	Base				
Evaluation Section 1 west end, fill of CH3 the early Holocene channel (CH3 likely forms the same channel as CH1)									
1.75	1 / 1 west / 1	1.66	1.65	0.09	0.10	P2	7	Eval trench: Soft sticky light brownish grey slightly clayey silt with frequent patches of Fe staining	Possible vegetated alluvial deposit subsequently cut by later channel/floodplain (CH4)
1.75	1 / 1 west / 1	1.26	1.25	0.49	0.50	P1	6	Eval trench: Soft dark blue grey silt with lenses of fine sand, some evidence of Fe stained root channel and rare fine plant fibres	Possible alluvial deposit with signs of river action/flood events possibly attributed to a less confined early Holocene channel (CH3)
Watching Brief Section 6, fill of CH1 the early Holocene channel (CH1 likely forms the same channel as CH3)									
0.80	14 / 6 / WB	0.77	0.76	0.03	0.04	P12	47	Watching brief: pale brown/yellow grey sand, fine	River action/flood events possibly attributed to a less confined early Holocene (CH1) channel
0.80	14 / 6 / WB	0.61	0.60	0.19	0.20	P11	48	Watching brief: olive grey silt slightly sandy	Sluggish flow possibly attributed to a less confined early Holocene (CH1) channel
Watching Brief Section 5 north-west end, fill of CH1 the early Holocene channel (CH1 likely forms the same channel as CH3)									
0.55	13 / 5 north-west / WB	0.36	0.35	0.19	0.20	P10	62	Watching brief: Brown clay, sandy to upper surface	Silting up/sluggish flow possibly attributed to a less confined early Holocene (CH1) channel
0.55	13 / 5 north-west / WB	0.16	0.15	0.39	0.40	P9	62	Watching brief: Yellow brown grey silty sand	River action/flood events possibly attributed to a less confined early Holocene (CH1) channel
Evaluation Section 1 east end, fill of CH4 a later channel (CH4 is possibly related to CH2)									
2.83	6 / 1 east / 1	2.79	2.78	0.04	0.05	P4	4	Eval trench: Firm light yellowish brown slightly silty clay with rare mollusc fragments, rare charcoal flecks and rare rounded medium gravel clasts.	Grading up into a more widespread alluvial deposit

1.81	3 / 1 east / 1	1.63	1.62	0.18	0.19	P3	4		Silting up of later channel/floodplain (CH4)
Watching Brief Section 5 south-east end, fill of CH2 a later channel (CH2 is possibly related to CH4)									
1.50	11 / 5 south-east / WB	1.39	1.38	0.11	0.12	P8	49	Watching brief: blue grey silty clay	Silting up/sluggish flow infilling later channel (CH2) cutting into earlier channel (CH1) sequence
1.50	11 / 5 south-east / WB	1.17	1.16	0.33	0.34	P7	50	Watching brief: greenish grey silty clay	
1.00	12 / 5 south-east / WB	0.91	0.90	0.09	0.10	P6	50	Watching brief: greenish grey silty clay	
1.00	12 / 5 south-east / WB	0.56	0.55	0.44	0.45	P5	50	Watching brief: sand lens within greenish grey silty clay	River action/flood events of latter channel (CH2) cutting into earlier (CH1) sequence

Table 11 QEL13 samples assessed for pollen

13.3.7 Results

13.3.8 The pollen results are presented in Table 11. Pollen preservation was found to be highly variable throughout the different profiles. Of the twelve samples examined, identification and good statistical counts were only obtained from five. In the other levels, pollen grains and spores were absent. Even in those horizons for which counts were made, many pollen grains were also degraded. This degradation appeared to be from chemical etching and abrasion. This undoubtedly occurred because of the character of the depositional environment of the sediment in, some cases, a moderately high-energy fluvial environment in the river channels and probably also, post-depositional degradation through oxidation. A total of 39 taxa were recorded from the five samples where preservation permitted identification and counting. This must be regarded as a relatively sparse and not a very diverse pollen assemblage.

Pollen sample	P1	P3	P4	P6	P7
Trees & Shrubs					
Betula				1	
Pinus	3	2	7		3
Ulmus				3	
Quercus	9	39	11	31	22
Fagus		1			
Tilia				1	1
Alnus	3	32	11	41	14
Corylus avellana type	1	``	10	20	3
Salix		1		3	
Herbs					
Poaceae	31	90	29	68	30
Poaceae-large/wild		1		6	1
Cereal type	17	1	1	5	2
Ranunculus type		1		5	
Brassicaceae Undiff.	3			9	
Sinapis type		1	1		6
Hornungia type		2			
Chenopodiaceae	12	5	13	5	5
Fabaceae					1
Anagallis				1	
Myosotis				1	
Rumex conglomeratus type				2	
Plantago major type				1	
Plantago lanceolata					
Bidens type			5	3	
Anthemis type	11			1	
Senecio type					1
Centaurea cyanus					1
Lactucoideae	13	9	13		13
Marsh					
Cyperaceae	13	9	5	3	9
Typha angustifolia type	1		3		7
Ferns					
Osmunda regalis					1
Equisetum				1	
Pteridium aquilinum		21	12	3	5
Dryopteris type	14	3	53	9	21
Polypodium	1	1	3		3
Miscellaneous					
Sphagnum			2		
Pediastrum		3	1		7
Pre-Quaternary	65	14	94	3	56
Dinoflagellates		1	1		

Table 12 Raw pollen count data.

13.3.9 Discussion

13.3.10 Section 1: West end of CH3 (P1 and P2)

13.3.11 This sequence has been attributed to the early Holocene. Two samples were examined (P1 and P2). Only P1 (6) at 0.49-0.50m bgl consisting of grey, thus non-oxidised, silt contained poorly preserved and sparse pollen. The pollen flora is dominated by herbs with only small numbers of trees and shrubs. The latter comprise small numbers of Pinus (pine), Quercus (oak), Alnus (alder) and Corylus avellana type (probably hazel but may include bog myrtle). The herbs comprise largely Poaceae (48%) including Cereal pollen type, Chenopodiaceae (goosefoot and orache) and Asteraceae types. The latter comprise Lactucoideae (dandelion types) and Anthemis type (various daisy family types). Marsh taxa are dominated by Cyperaceae (sedges). Fern spores comprise monolete (Dryopteris type; typical ferns) Pteropsida and Polypodium. Very substantial numbers of reworked/derived pre-Quaternary palynomorphs are also present.

13.3.12 Interpretation: A suggested early Holocene age for the sediment is in conflict with the apparent occurrence of cereal type pollen. However, such thick walled and large Poaceae pollen grains of this type do occur in late Devensian and early Holocene spectra. These may come from a small number of grass taxa having such larger and robust pollen. The dominance of herbs and relatively few trees and shrubs is, however, in accord with the suggested early date for the sediment and suggests that open herbaceous habitats prevailed. The on- and, near site vegetation was a grass-sedge fen or marginal vegetation to a flowing river. Arboreal pollen in this situation may have been from longer distance, regional sources, especially pine.

13.3.13 The large number of reworked pre-Quaternary/geological palynomorphs are diagnostic of alluvial sediments and come from erosion of bedrock or earlier alluvial sediment.

13.3.14 Summary: The pollen shows an open herbaceous landscape with few if any trees and shrubs and an on or near site vegetation of grass-sedge fen with some bur-reed or reedmace. Such open habitats may be attributed to the Devensian cold stage and very early Holocene or, a much more recent, post woodland clearance, historic age material.

13.3.15 Section 1: east end fill of CH4 (P3 to P4)

13.3.16 Both samples from this section produced pollen enabling pollen counts of 200 (P3) and 100 (P4) to be made.

13.3.17 Trees and shrubs are more important in the lower sample (P3) at 0.18-0.19m bgl. However, herbs are dominant. The woodland components comprise largely Quercus with Alnus and some Corylus avellana type. P3 has a single record of Fagus (beech) and P4 an occurrence of Tilia (lime/linden). Herbs in both samples are dominated by Poaceae with occasional cereal type and large (wild) grasses. Other herbs include Plantago lanceolata (esp. P3), Chenopodiaceae (goosefoot and orache), Lactucoideae (dandelion types) and sporadic occurrences of Brassicaceae (charlocks) and Ranunculus type (buttercups). Wetland taxa comprise Alnus (noted), Salix (willow; P3) and Cyperaceae (sedges). A proportion of the Poaceae may also be attributed to the wetland habitat.

13.3.18 Interpretation: The environment appears to have been partially wooded with some decline evident upwards. This woodland consisted of oak, probably with some hazel growing on drier soils and may have been managed. Alder was a constituent of the damper environment probably growing along the fringes of the channel along with willow (Salix). However, a copious producer of wind disseminated pollen, it is possible that the alder pollen here may have been transported from more dominant areas of floodplain carr woodland. Beech (Fagus in P3) and lime (Tilia in P4) are, in contrast, underrepresented in pollen spectra and may have been growing in

proximity to the channel but on drier soils. There is, however, also the possibility that fluvial rather than airborne transport may have introduced the pollen.

13.3.19 The dry-land, herb flora appears to have been dominated by grassland as illustrated by the high values of grass pollen (Poaceae) along with taxa such as ribwort plantain (Plantago lanceolata) and dandelion types (Lactucoideae). Based on the available pollen data, it is not clear whether this was pasture. Cereal pollen, indicative of arable activity, is less well represented in pollen spectra and the two occurrences here may be from local cultivation.

13.3.20 The on-site, autochthonous component was one of grasses-sedges probably fringing the river channel along with alder and willow.

13.3.21 The high values of reworked pre-Quaternary palynomorphs are attributed to erosion and deposition of older sediment in this fluviatile environment. The substantial numbers of fern spores (Dryopteris type in P4) may also be reworked from older sediment and/or soil inwash to the catchment. Small numbers of freshwater, algal Pediastrum attest to open standing or slow flowing water.

13.3.22 Summary: These two samples show a predominantly open grassland, possibly a pasture environment with the possibility of some arable cultivation. Local and regional woodland consisted of oak and hazel with alder growing on wetter soils fringing the channel. There is the possibility of some localised beech and lime in the vicinity although fluvial transport may have transported pollen from farther afield. The depositional habitat was grass-sedge fen that was fringed by alder and possibly willow. An historic date is likely.

13.3.23 Section 5. South-east end of CH2 (P7 to P6)

13.3.24 Three samples from this profile were examined. Counts of 204 were obtained from P6 and 100 from P7. The lowest (P5) was devoid of Holocene pollen. That is, taken from a coarser sandy lens within the silty clay.

13.3.25 This profile has strong similarities with the east end of Section 1, above. Although herbs are dominant, there is a moderate representation of tree and shrub pollen. The latter comprise Quercus with Corylus (esp. in P6). There are also small numbers of Pinus, Ulmus (elm) and Tilia. Herbs are dominant in both samples with Poaceae being dominant (esp. P6). Cereal type pollen and that of certain large wild grasses (possibly Glyceria fluitans) are present in both samples. Other herbs include Ranunculus type (buttercups), Chenopodiaceae, Sinapis type (charlocks), Plantago lanceolata, Asteraceae types, the latter including Lactucoideae, Anthemis type, Senecio type, Bidens type and especially Centaurea cyanus (blue cornflower).

13.3.26 There is not a strong representation of the autochthonous wetland flora. Cyperaceae with Typha angustifolia/Sparganium type is more notable in P7 and Osmunda regalis (Royal Fern) is also present with freshwater algal Pediastrum. This higher sample also has greater numbers of reworked geological palynomorphs in keeping with the alluvial silt fills.

13.3.27 Interpretation: As with Channel 4 (3.ii. above), the local environment was largely open but with some evidence of remaining oak and hazel woodland in the region. This may have been managed. Here, there is also some evidence of elm (Ulmus) and similarly small numbers of lime which may have come from some growth near the site.

13.3.28 The herb flora is of predominantly pastoral affinity. There are, however, indications of local arable cultivation with cereal type pollen and associated weeds. The latter include charlocks (Brassicaceae) and especially blue cornflower (Centaurea cyanus in P7).

13.3.29 The depositional habitat was probably fringed by alder and willow as suggested for the Channel 4, east-end, section. This was especially the case in the lower levels whereas, upper sample (P7) has more evidence of wetter conditions with Pediastrum.

13.3.30 Summary: The pollen suggests a largely open grassland habitat in proximity to the channel at the time of this sediment accrual. Alder and willow fringed the channel in its earlier phase but there is tentative evidence that conditions became wetter. There is also evidence for arable cultivation in the vicinity. Localised woodland of oak and hazel existed in the region. Overall, the profile has similar characteristics to those seen in Channel 4, east-end. The sequence is probably of historic age.

13.3.31 Overall summary and conclusions

13.3.32 The following principal points have been made in this evaluation study.

- Pollen was generally very poorly preserved, sparse and absent in some samples, notably those sediments of Section 5 (P9 and P10) and Channel 1 (P11 and P12). However, some useful pollen data has been obtained which shows the depositional environment and local vegetation at the time of sediment deposition.
- Channel 3 is thought to be of early Holocene age. The data clearly show an open environment although pollen described as cereal type is present and is incongruous for this date. However, there are many cases of large size, thick walled cereal type grains in the late-Devensian and early Holocene which come from certain wild grass varieties.
- Channels 2 and 4 have similar palynological characteristics and the sediments are probably of historic date.
- Channels 2 and 4 show a largely open, grassland environment in proximity to the site. This may have been pasture.
- Channels 2 and 4 also have some evidence of local arable cultivation.
- Woodland is also seen in Channels 2 and 4 and consisted largely of oak and hazel which was probably growing in the region and may have been managed. There is the possibility that other taxa including beech, lime and elm may have been locally present.
- The depositional habitat was fluviatile depositing many reworked geological palynomorphs. Channels 2 and 4 were fringed by marginal aquatic herbs which included grass, sedges and other fen plants such as bur reed and/or reedmace and Royal Fern. Alder and willow probably also fringed the banks of the now palaeo-channels.

13.4 Botany

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13.4.1 Introduction/methodology

13.4.2 Four samples have been assessed from the site's channel fills [50]{15}, [60]{16}, [62]{17} and [63]{18}. The samples were processed by flotation and the resultant flots scanned, using a low-powered binocular microscope. The abundance, diversity and general nature of plant macrofossils and faunal remains were recorded, and are summarised in Table 12.

13.4.3 Results

13.4.4 A large and diverse assemblage of waterlogged plant remains was recorded from sample [50]{15}, from the uppermost of the sampled channel fills. This included much wood, some of it worked, and plant stems, as well as seeds from a variety of sources. Hop (Humulus lupulus) seeds were the most abundant species observed, suggesting local cultivation or use of the plant for brewing. Occasional food remains including grape (Vitis vinifera) pips, cherry (Prunus avium/cerasus) stones and hazel

(Corylus avellana) shell were seen but the majority of seeds were from wild plants. These represented several habitat-types and included wetland plants, arable weeds and indicators of disturbed and waste ground. Many of these would have been dumped, or arrived from the surrounding environment, but conditions in the channel itself are indicated by seeds of pondweed (Potamogeton sp.) and horned pondweed (Zannichellia palustris) and large numbers of freshwater molluscs, all of which indicate a still or flowing body of water in the channel. Willow (Salix sp.) buds and seed capsules would have come from trees on the channel banks.

13.4.5 Flots from the remaining three samples were very similar, all consisting almost entirely of roots and plant epidermis, from roots or stems. A very small number of seeds was seen in channel fill [60]{16}, most suggesting shallow water or marshy ground, but with a single seed of cultivated flax (Linum usitatissimum). No seeds at all were seen in [63]{18} and just one from [62]{17}. None of these samples produced any invertebrate remains.

13.4.6 *Potential*

13.4.7 Detailed identification of the seed and mollusc assemblages from [50]{15} would give a clearer picture of activities and perhaps land-use in the vicinity of the channel, as well as more detail about the environment of the channel itself.

					chd wood	**wlg seed**	**wlg misc**	
sample	**context**	**proc vol(l)**	**flot vol(ml)**	**proc**	**A D**	**A D**	**A D**	**comments**
15	50	7	600	F	1 1	3 3	3 3	WET. MIXED SEEDS INCL HOPS & FEW FOODS
16	60	5	150	F	1 1	1 1	3 1	WET. 99% EPIDERMIS & ROOTLETS, FEW SEEDS
17	62	5	300	F		1 1	3 1	WET. 99.9% ROOTS ETC. 1 SEED SEEN
18	63	5	400	F			3 1	WET. 10% ROOTS ETC. NO SEEDS SEEN

Table 13: Summary of botanical assessment data from environmental samples:

A: abundance, D: diversity (1 = occasional, 2 = moderate, 3 = abundant)

13.5 Geoarchaeological discussion

13.5.1 This section will examine the deposits recorded in the evaluation trenches (MOLA 2013b) and during the watching brief. Primarily this includes Section 1 of evaluation trench 1 (Fig 3) and sections 5 and 6 (Fig 4 and Fig 5) of the watching brief. The natural Holocene sequences recorded sediments laid down by a number of possible Holocene channels. The lowest and assumed earliest of these channel deposits is CH1 in the north west of Fig 4 and Fig 5, and likely relate to similar sediments of CH3 in the west of Fig 3. The fluvial sediments of CH1 and CH3 form the banks of a more constrained channel recorded in the south east of Fig 4 and Fig 5 and the east of Fig 3. The palaeoenvironmental assessment of these sequences is synthesised below with the sediments grouped into three facies.

13.5.2 Facies 1 - Pleistocene

13.5.3 Facies 1 represents the floodplain deposits of sandy gravel laid down during the Pleistocene and forming the topography across the floodplain in the early Mesolithic. The surface of the gravels were recorded from -3.62m OD in evaluation trench 1 (MOLA 2013b) and between -2.43 and -2.5m OD in the watching brief. Although, these gravels would have formed the early Holocene or Mesolithic topography no indication of soil horizons or Mesolithic material was noted. The DEM of the early Holocene surface (Fig 6) suggests the gravel surface rises beyond the east and west of the site to c 1m OD or higher towards remnants od the Kempton Park Gravel terrace, c 100m or more beyond the edge of the site. The site itself lies within the low-lying floodplain of a possible early Holocene valley inhabited by a tributary channel (CH1) of the River Thames, south west to north east aligned. The tributary appears to drain or bisect the Horselydown eyot.

13.5.4 Facies 2 – Early to mid-prehistoric

13.5.5 Facies 2 is a sand to sandy silt/clay which probably represents freshwater sediments laid down during the ameliorating climate of the late glacial period to the very early Holocene. The finer grained deposits may be of a mid-prehistoric date. The facies is recorded between c 3 and -3.5m OD onsite. As glacial melt water abated towards the end of the last Glacial period the flow rate would have slackened and deposited thick sands and mid channel bars. In the early Prehistoric, before relative sea-level rise caused peat formation and widespread minerogenic sedimentation, such gravel bars and small low floodplain islands could have been used as activity camps by Mesolithic peoples for flint tool production and temporary camps. These islands were ideal locales for temporary camps as they provided easy access to the rich river side resources. Ephemeral evidence of such activity was recorded onsite in the form of worked and burnt flint and was sealed within the facies 2 sediments by subsequent periods of early and short-lived minerogenic sedimentation, probably from the mid to late prehistoric. The pollen remains record an open herbaceous environment with few trees and possible sedge fen, this is indicative of the Late Glacial and early Holocene. Despite these remains, the facies 2 sediments were relative coarse and aerated and as such provided generally poor preservation of diatoms and ostracods.

13.5.6 Facies 3 – Late prehistoric to historic

Brown to blue grey silty clays are recorded onsite from c 3 to -0.5OD. These deposits represent the transition from freshwater environs to more widespread estuarine minerogenic inundation as a result the ponding back of inland water ways driven by a trend of relative sea level rise. The pollen remains depict open grassland onsite with alder and willow fringing the site. There is some reduction of the woodland in the wider landscape evident with increasing relative sea level change and estuarine inundation. The woodland reduction in the wider landscape is likely driven by a combination of increased inundation and clearance activity associated with arable agriculture also seen in the wider environment. The diatoms showed a

mix of freshwater and estuarine species living in situ but no marine in washing until the upper levels of the sequence (context 49). The minerogenic sedimentation of facies 3 infill the undulations and deeper areas of the tributary valley, levelling out the topography over the course of the historic period. Even so the landsurface would have still been periodically flooded and relatively waterlogged, therefore permanent occupation would have been unlikely at this time.

14 Potential of the data

14.1 Realisation of the original research aims

14.1.1 *What is the level and profile of the underlying natural sands and gravels on the remainder of the site?*

14.1.2 The natural gravel was recorded onsite at c -2.5m OD generally but does deepen to -3.62m OD in the augerhole in the south west of evaluation trench 1.

14.1.3 *Can the edge or limits of the palaeochannel recorded in the evaluation be identified on the site?*

14.1.4 Oblique sections through the later Holocene (later prehistoric to historic) confined channel where recorded during the watching brief (Fig 3 to Fig 5) and the wider less constrained early Holocene channel valley is outlined in the DEM (Fig 6) and may be up to 300m wide. However, considering the minimal spread of sub surface data around the site it the width of the this channel valley as it drains or even bisects Horsely Down eyot is likely to be a lot less than 300m.

14.1.5 *What is the nature of any further alluvial sequences on the site? How do these compare with the deposits recorded during the earlier trench evaluation at the site?*

14.1.6 Basally the sequence recorded prehistoric coarse grained sediments representing the slackening flow after the glacial meltwaters abated and the formation of channel bars and islands used by prehistoric peoples for very short periods. The upper alluvial sequences are predominantly minerogenic and lack significant organic inclusions, representing waterlogging and estuarine inundation of this low lying tributary floodplain up into the historic period. The watching brief sequences align well with previous evaluation sequences.

14.1.7 *Is there any evidence of prehistoric activity on the site?*

14.1.8 Worked and burnt flint was recorded on the sand and silt banks/mid-channel bars that formed in the less constrained early Holocene tributary valley. This probably represented short-lived activity camps situated in close proximity to the rich resources of the river.

14.1.9 *Are any further alluvial clay deposits recorded on the site comparable to those recorded to the west recorded at Potters Fields (site code POE04) which represent periods of inundation dating from the Roman period onwards?*

14.1.10 The Roman land surface was recorded between 0.95m OD and 1.28m OD at Potters Field. At this elevation the deposit sequence at QEL13 represented open grass-lands periodically waterlogged by river flooding. Such conditions would have made Roman occupation highly unlikely at QEL13. The sequences of sands representing fluctuating higher and lower energy fluvial deposition is comparable at both sites but those recorded at POE04 were recorded 1 to 2m higher in elevation than at QEL13 and likely represent the difference of landscape position for POE04 atop Horselydown eyot proper and QEL13 within a low lying channel valleythat cut into or bisected the eyot.

14.2 Assessment of the monitoring

14.2.1 The sampled sections provided sequences of clays,silts and sands to the surface of the gravels. The three sequences across the site provide complimentary findings and in combination adequately characterises the site wide deposit sequence as predominant early prehistoric mid channel bars and fluvial activity, late prehistoric to historic open marginal mudflats and grasslands with clearance activities and agriculture indicated offsite probably on the higher drier terrace.

15 Significance of the data

15.1.1 The assessment carried out on the trench samples from QEL13 provides a record of landscape change likely from the early prehistoric up to the historic period. The topographic mapping produced indicated that the site lies within the low lying valley of a north south tributary of the River Thames. However, the predominantly minerogenic deposits despite recording changing hydrology, vegetation and relative sea level rise only provided minimal potential for further work.

15.1.2 Whilst the archaeological remains are undoubtedly of considerable local significance there is nothing to suggest that they are of regional or national importance.

16 Appendix: Data

Diatom Taxon/Laboratory Sample Number	D1	D3	D4	D5	D6	D7	D8	D12
Polyhalobous								
Paralia sulcata	1		1			1	1	
Polyhalobous to Mesohalobous								
Pseudopodosira westii			1					
Mesohalobous								
Cyclotella striata			3	2	3	1	2	1
Navicula salinarum					2			
Nitzschia navicularis	1				1	1	1	
Thalassiosira bramaputrae			cf				1	
Mesohalobous to Oligohalobous Halophilous								
Actinocyclus normanii			1	1	1			
Cyclotella meneghiniana					1			
Nitzschia levidensis					1			
Oligohalobous Halophilous								
Navicula cincta					1			
Navicula mutica					1			
Oligohalobous Halophilous to Indifferent								
Rhoicosphaenia curvata				1				
Surirella brebissonii					1			
Oligohalobous Indifferent								
Amphora libyca							1	
Cocconeis placentula			2	2	2	1	1	
Diatoma vulgare					1			
Fragilaria construens							1	
Fragilaria pinnata					2			
Navicula tripunctata				1				
Opephora martyii			2	1		1	2	
Unknown Salinity Group								
Cocconeis sp.							1	
Gyrosigma sp.						1		
Navicula sp.					1			
Unknown diatom fragment		1						
Unknown Naviculaceae		1						

Table 14 diatom species data (1 – present; 2 – common; 3 – relatively abundant)

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Fig 20 Site location

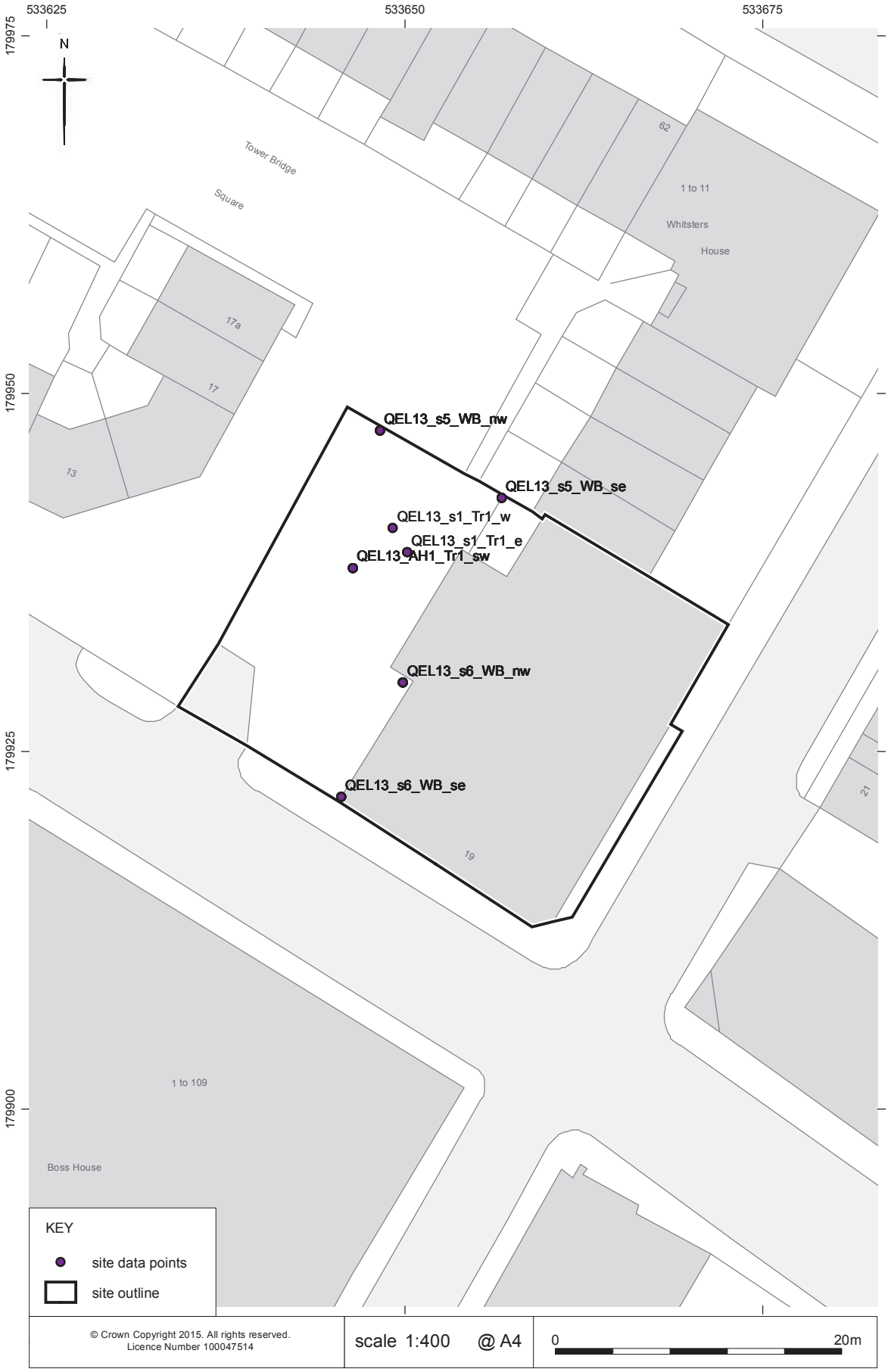

Fig 21 Location of interventions and data points

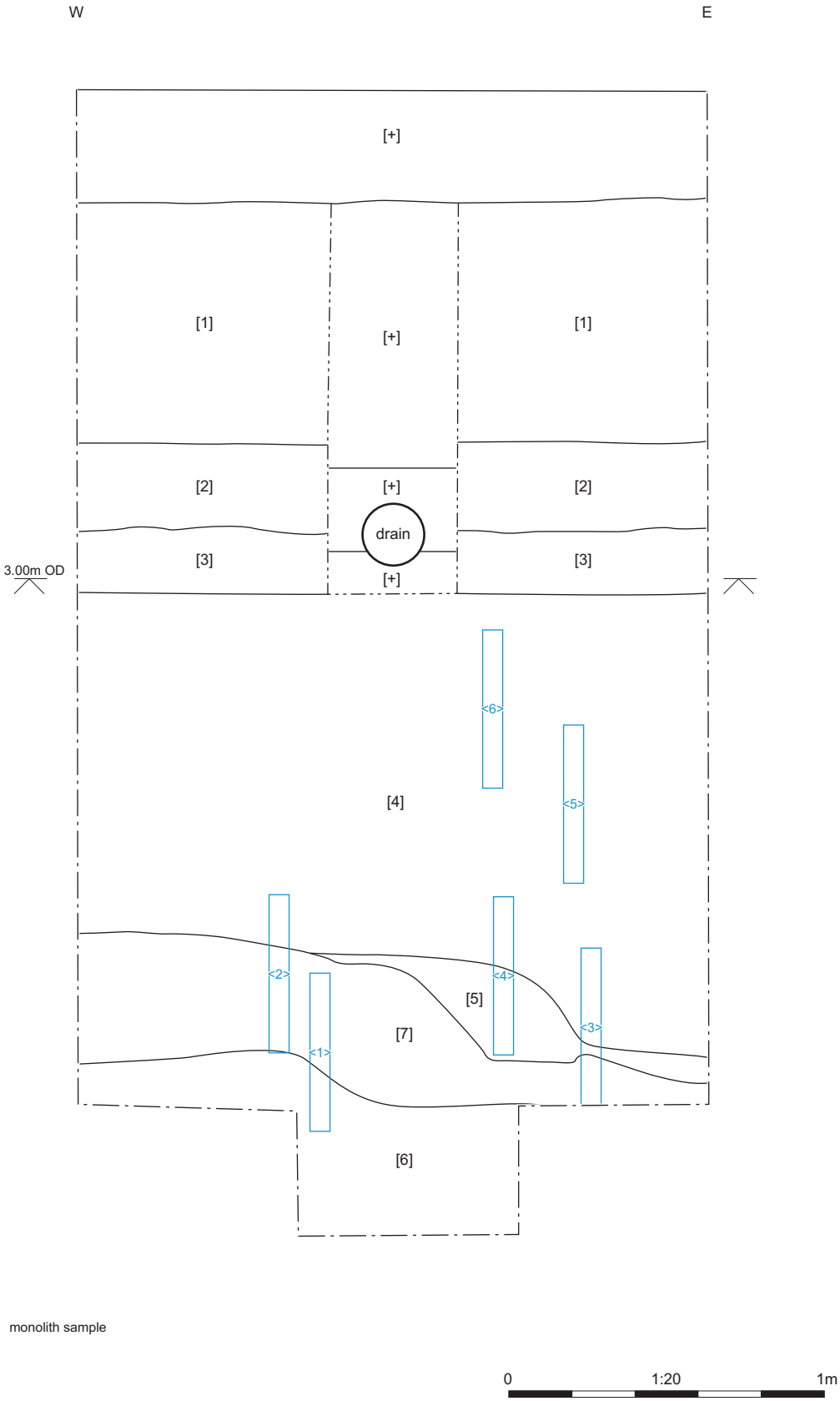

Fig 22 Section 1: South facing section of Evaluation Trench 1

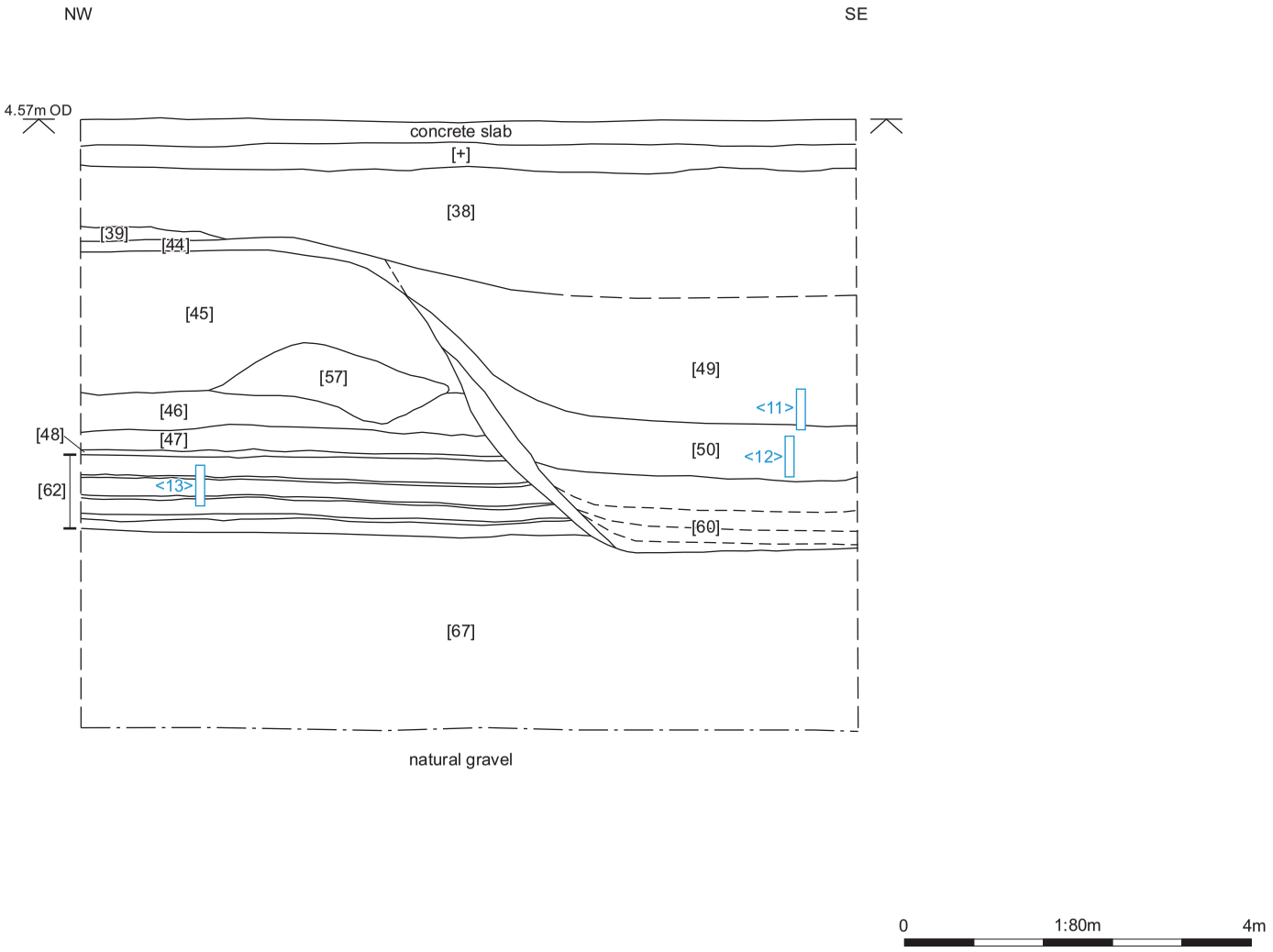

Fig 23 Section 5: South-east facing section of Watching Brief

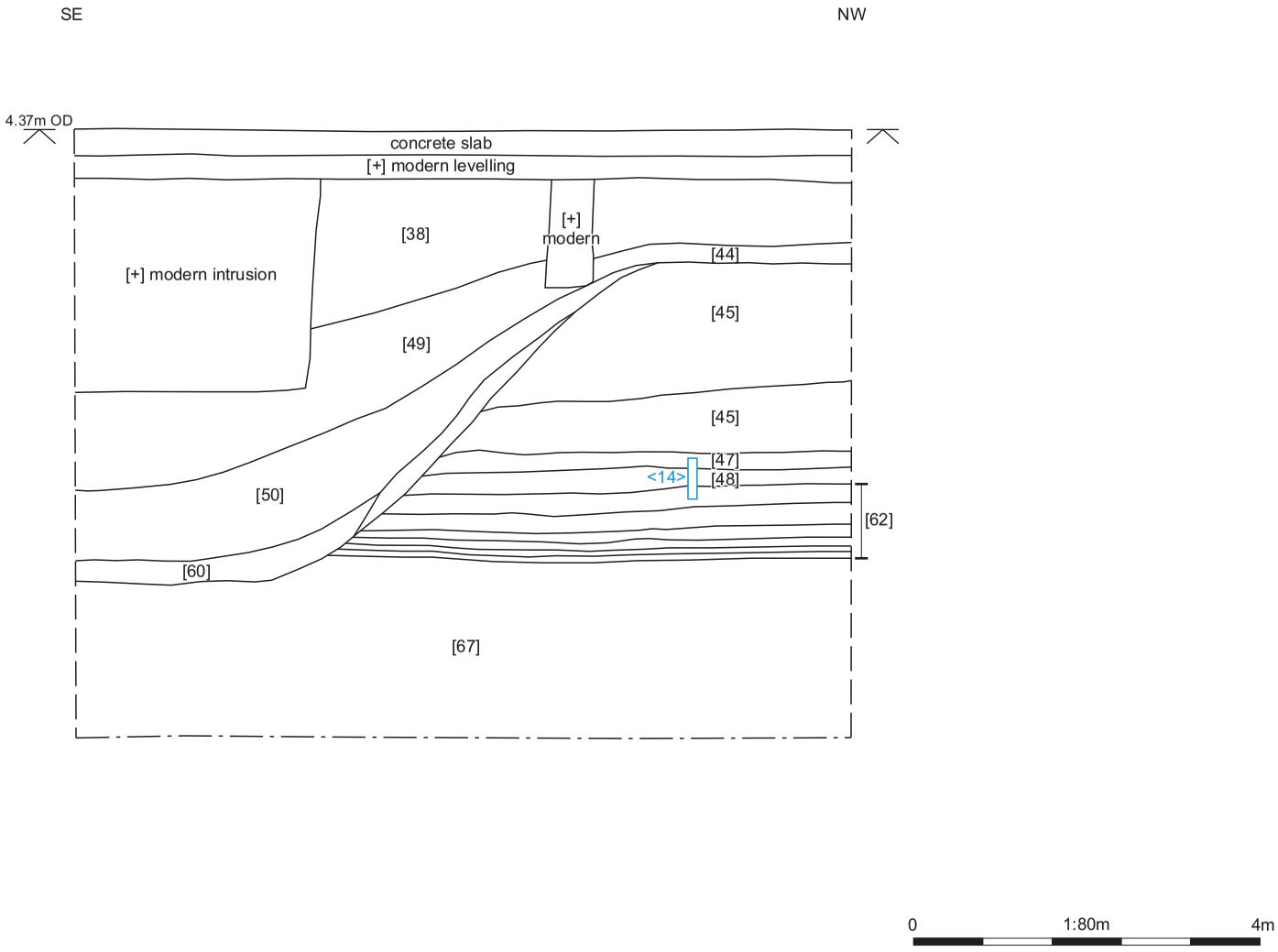

Fig 24 Section 6: North-east facing section of Watching Brief

Fig 25 Early Holocene Surface