

TOWER PIER, LONDON

TQ 3345 8045

**REPORT OF AN ARCHAEOLOGICAL WATCHING BRIEF
PROJECT CODE THR 99**

**CARRIED OUT ON BEHALF OF THE PORT OF LONDON
AUTHORITY**

OXFORD ARCHAEOLOGICAL UNIT

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OXFORD ARCHAEOLOGICAL UNIT

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1 INTRODUCTION

1.1 Reason for the project

The river Thames has played a central role in the development of London from Roman times onwards. The river provided port facilities which were crucial to the city's development as a world trading centre throughout the medieval, post-medieval and modern periods, but river traffic (and especially freight carriage) has declined significantly during the second half of the 20th century. In recent years, however, there has been a general wish to reverse this trend and see greater use of the Thames, especially for passenger transport. This has been exemplified by government initiatives to encourage the construction of new piers and associated infrastructure to support the traffic. Several existing piers are also in the process of redevelopment.

The outmoded and visually intrusive Tower Pier was therefore ripe for redevelopment, and the Port of London Authority (PLA) took the lead in submitting a planning application for a new pier. It was recognised that reconstruction of Tower Pier could have significant impacts on the archaeology of the Thames foreshore and the Tower wharf. The latter enjoys statutory protection as part of the Tower of London Scheduled Ancient Monument (Greater London No 10). The Tower is also a World Heritage Site. The river Thames is an obvious prime national asset both for its part in British maritime history and because of its ecology.

1.2 Tower Pier

Tower Pier was built some 70 years ago, and was subsequently extended to form two linked pontoons connected to Tower Pier Approach by a pair of brows. One of these ran straight out to the upstream pontoon, while the other approached the downstream pontoon via two dog-leg turns. The pontoons contained an agglomeration of blue sheds providing accommodation for PLA staff, ferry operators and H M Customs and Excise. These were visually intrusive in views into and out from the Tower of London, especially at high tide, and the facilities on board the pontoons were cramped and out of date. The proposed new pier was to be a single long pontoon, with a low-level glazed structure containing all the necessary facilities. This was intended to be as 'see-through' as possible in order to minimise its intrusiveness on the Tower. The new pontoon would be accessible via two new brows, running in parallel from a new bankseat (timber deck) supported on piles in front of Tower Pier Approach. The new pontoon would also require the construction of three new monopiles (one at each end and one in the middle) which would support the structure as it rose and fell with the tide.

1.3 Archaeological appraisal of the development's potential impact

Graham Keevill of OAU prepared a detailed archaeological appraisal of the Tower of London foreshore and the potential impact of the Tower Pier redevelopment on it in March 1998, in conjunction with Mike Webber of the Thames Archaeological Survey. This report was prepared while Keevill was seconded to Historic Royal Palaces as the Tower Environs Scheme Archaeological Officer. The appraisal showed that the foreshore of the river Thames at the Tower of London has significant but variable archaeological potential. It was suggested that possible impacts from the redevelopment of Tower Pier were variable, but at their very worst could be severe. A staged approach to archaeological mitigation was devised, commencing with pre-

construction surveys undertaken in conjunction with the Museum of London and the City of London Archaeological Society. These works were undertaken in Spring and early Summer 1998 and have been or are to be reported on separately. It was recognised that there was likely to be a need for further archaeological work during the early stages of development, especially during the piling operation for the new bankseat. That stage of work is the subject of this report.

In October 1998 the Greater London Archaeology Advisory Service (GLAAS) of English Heritage wrote to the Planning Department of the London Borough of Tower Hamlets recommending that planning permission for the redevelopment of Tower Pier should be made conditional on the attendance of an archaeologist during testing of pile locations. This attendance was to be in accordance with a Written Scheme of Investigation prepared in compliance with GLAAS guidelines. Subsequently the Port of London Authority commissioned the OAU to undertake the attendance (definable in archaeological terms as a Watching Brief or Site Monitoring). The methods for the first stage of site investigations were agreed with English Heritage by fax and telephone communications on 14 February 1999. The WSI for the main phase of trial and construction work was submitted to English Heritage on 26 March 1999, and they wrote to the Planning Department of the London Borough of Tower Hamlets approving this on 31 March 1999.

2 ARCHAEOLOGICAL MITIGATION: THE APPROACH

2.1 Stages of excavation and the archaeological response

It had been agreed in advance that each pile location would be tested for obstructions. This had the dual purpose of determining whether the locations presented any engineering or archaeological problems. The first stage of testing involved manual excavation of spade pits allied to powered augering where spade digging was physically impossible. This work was carried out in late February 1999 and was covered by an archaeological watching brief undertaken by Graham Keevill and Duncan Wood of OAU. A brief report of the results was forwarded to the Greater London Archaeological Advisory Service for information and to inform subsequent stages of work.

The next stage of work took place from mid-March 1999 and comprised the excavation of test pits on each pile location. This was undertaken with a small 360° tracked mechanical excavator which had to be craned onto and off the foreshore from a moored barge according to the tidal cycle. The test pit at pile location 1 involved the removal of several of the lower stone treads from Tower Stairs by diamond cutter; virtually all excavation beneath the treads had to be by hand because the timber supports for the existing pier were still in place and precluded mechanical access. The excavations were again dealt with under an archaeological watching brief, commenced by Christine Bloor and continued by Graham Keevill.

Most test pits did not contain any archaeological obstructions, but potentially important structural remains were found at three locations: masonry at piles 9 and 13, and timbers at pile 10. Extended excavations were therefore carried out using the same mechanical excavator and under the same conditions over and between pile locations 9, 10 and 13 during April 1999. This work was subject to a detailed watching brief and archaeological recording all undertaken by Graham Keevill.

Extensive negotiations took place between Mr Keevill, Bob Naish of Mouchel Consulting Engineers and Nick Truckle of English Heritage regarding the appropriate method of dealing with the structures. The engineers found that the pile locations could not be moved away from the archaeological remains without placing unacceptable loads on other piles or on the Tower of London's wharf-edge wall, and it was reluctantly accepted that the masonry could be broken out to the extent needed for piles 9 and 13, and that one timber could be removed from pile 10. This work was carried out under very close archaeological control and recording. This level of recording would not have been possible during the percussion driving and drilling of the piles which formed the next construction process. While some archaeological remains were therefore lost, it was at least possible to mitigate the impact in a way which could not have been achieved during normal piling operations. A number of further monitoring visits were made during May and early June 1999 when piling was in progress.

It should be stressed that all fieldwork was carried out within a highly pressurised construction schedule where any delay represented a severe cost risk for all concerned, while the tidal timetable meant that both the engineering and archaeological works had to be achieved within the constraints of the available hours of work. This meant that excavation might have to be abandoned for days on end because low tide did not occur during workable hours; pits and trenches always had to be backfilled at the end of each working session because the tidal ingress would destroy unsupported excavations and make them into a potentially lethal health and safety hazard. Recording was also difficult, partly because of the time constraints on each tide, and partly because of the lack of fixed points which would allow the various stages of work to be cross-referenced (the existing pier was being dismantled as excavation proceeded, removing what would have been usable location markers). Every attempt was made to ensure the maximum possible accuracy of recording but some degree of error was inevitable in the circumstances.

2.2 Analysis, data coordination and this report

The coordination of archaeological observations made at different times and by different people can be difficult, but on this occasion the stages of work occurred within a fairly short space of time. This means that the correlation of context descriptions has been relatively straightforward and has allowed equivalent contexts to be defined between (for instance) the pile test pits and the extended excavations undertaken subsequently. The stratigraphic sequence is therefore reasonably well understood, although the lower deposits could only be observed in limited exposures and then only from the surface because the severe risk of collapsing sections precluded any access into the deeper excavations on health and safety grounds.

A lack of reliable dating evidence means that the stratigraphic sequence of deposits and structures cannot be dated with accuracy or confidence. Numerous fragments of pottery, clay pipe and tile were noted during the excavations (as they can be on the surface of the Tower foreshore at any low tide), but the date range of pieces found in the upper contexts was so wide (eg 16th- to 19th/20th-centuries) that their collection served no useful purpose. No finds were noted in the lowest contexts where dating evidence would have been most valuable. The comments regarding dates in both the description and discussion must be read with this in mind; they are entirely inferential.

The description of contexts in section 3 of this report commences with a brief note of the remains

found in test pits at pile locations 9, 10 and 13. This is followed by more extensive consideration of the results from the trenching which followed soon afterwards. The observations at this stage wholly superseded those from the test pits because of the larger scale of the work, but it should be stressed that the excavations were still confined to generally narrow trenches. The stratigraphy was not always identical from one trench to another, and some allowance has had to be made for this in assessing the equivalence of contexts from different locations. The terms 'deposit' and 'layer' are used interchangeably throughout.

2.3 The archive

The project archive is with the Oxford Archaeological Unit at the time of writing (August 1999). It will be transferred to Historic Royal Palaces in the immediate future to be kept in their collections at the Tower of London.

3 RESULTS

No archaeological features were observed at any location other than piles 9, 10 and 13. A very large iron pipe was found running north-south at a depth of approximately 1.2 m below the existing Tower Stairs at pile 1; this is a Victorian or later feature, apparently inserted through the concrete bedding for the stairs. An iron pipe visible on the foreshore at the maximum low water mark is on the same alignment, and is probably the same feature.

3.1 Results from pile locations 9, 10 and 13: the test pits

Masonry structures were found in the test pits at piles 9 and 13, and a timber structure at pile 10. During the initial stage of test pitting the two masonry features appeared to be identical, comprising brick, flint and stone rubble in hard (concreted?) mortar with the surface sloping down to the south, and they were given the same context number (4). The structure terminated at the south end of each pit and was sealed by a loose silty sand varying slightly in colour from mid-light grey (3) to dark grey (6) at pile locations 13 and 9 respectively. Layer 3 overlay the front (south) edge of the structure and extended down its face for approximately 0.9 m to the base of the test pit excavation, and was sealed by a loose mixture of sand, gravel and rubble (2). At pile 9 by contrast layer 6 was up to 0.5 m thick over all of the structure but it sloped down in the south half of the test pit and was sealed there by a loose very dark grey sandy clay with a little rubble. The current foreshore level of loose sand and gravel formed the top layer in each pit (contexts 1 and 5 at piles 13 and 9 respectively) and was typically 0.2 m thick.

3.2 Results from pile locations 9, 10 and 13: the extended excavations

As one might expect the extended excavations which followed on from the test pitting was significantly more informative. In particular it demonstrated that structure 4 was not a single continuous entity but rather formed two discrete features. Several groups of structural timbers were also exposed, though their relationship with the masonry could not be established with certainty. The trenches were usually no more than 0.6 m wide (but reaching a maximum of *c* 1.6 m in places) while the excavation depth varied but was generally 1.2 m - 1.5 m; this was extended to approximately 2.5 m at the exact locations of piles 9 and 13 to ensure that they would be clear

of the masonry structures. Such deep and narrow excavations in waterlogged sand and gravel foreshore deposits are inherently unstable, especially as the need to backfill all excavations in advance of the flow tide meant that trenching often exposed previous days' loose backfill. Neither the archaeologists nor any other personnel entered any of the deeper excavations, and where possible even the edges of the excavations were avoided as well. All measurements in the deeper excavations must therefore be taken as approximate, and all of the following text must be read with these comments in mind.

3.2.1 Deposits at the base of the sequence

The final stage of trial excavation in advance of piling comprised two trenches measuring *c* 4 m (north-east to south-west) x 1.2 m narrowing to 0.7 m in the northern 1.5 m up to the riverside wall. These were intended to clear the positions of piles 9 and 13 of solid archaeological obstacles (ie masonry structures 11 and 10 respectively) in a controlled manner, and excavation was taken to a depth of approximately 2.5 m to make sure that the locations were clear of further impediments. Stiff mid-brown clay (33) resembling London Clay was found at the lowest level of pile location 9, extending for perhaps 0.1 m upwards into the excavations. This was overlain by a roughly 0.1 m-thick deposit of chalk (32), in turn overlain by a 1.2 m-thick mixed clay and gravel (31). The same basic sequence was observed under masonry 10 at pile 13, though the mixed clay here was no more than 0.7 m thick; the same context numbers were retained for the three deposits.

3.2.2 Masonry structures 10 and 11 and associated deposits

At pile 9 the mixed clay (31) was overlain by a masonry structure (11) comprising lumps of stone, brick and flint in compacted and concreted mortar; the deep excavation showed that this was only 0.3 m thick, but it still required a compressor-driven hammer to break through it. The structure may originally have extended up to the riverside wall, but its south-east side had been cut away 2.5 m to the south of this and it was therefore absent where the trench extended up to the wall. Structure 11 was approximately 2.2 m wide (south-east to north-west) and would have been *c* 3.6 m long if it did extend to the riverside. The equivalent structure (10) at pile location 13 was essentially the same in composition, but was up to 0.8 m thick, sloping away somewhat to the south as the current foreshore surface does. This structure definitely abutted the riverside wall, and extended 4 m out from it. The masonry was 3.2 m wide (south-east to north-west) and was separated from structure 10 by 2.2 m. The upper surfaces of the structures were typically 0.7 m below the existing foreshore level, deepening to 0.9 m in places.

The space in between the two structures was filled by loose very dark grey sandy clay and gravel (24, probably the same as context 3). The thickness of this deposit was not exposed as excavation largely ceased once the edges of the masonry had been defined. Excavation was deeper (approximately 1.8 m) on the south-east side of masonry 10, and a layer of clay (17) was noted in the base of the excavations here. This was overlain by a *c* 0.4 m-thick rubble, clay and dark brown gravel layer (18) which was sealed by a 0.6 m-thick layer of loose very dark grey-brown gravel (19, probably the same as 24; probably also the same as layer 31 under structure 11). It was difficult to be certain in the conditions but these layers appeared to cut by masonry 10; certainly the upper surfaces of 19, 24 and the masonry were at the same level.

3.2.3 Timber structures

Several timbers were found at about the same level as masonry 10 and 11, either in isolation or in groups. Two distinct types of timberwork were encountered: vertically driven stakes or piles, often with associated tie beams, and a single grouping of three re-used structural timbers. The stakes/piles and tie beams occurred in three groups which will be described in sequence, starting from the south-east.

Stake/pile 12 was found approximately 2 m (to the centre of the pile) from the south-eastern edge of structure 10 and *c* 2.1 m out from the riverside wall. The timber was roughly 0.2 m square. It was first seen about 0.8 m below the existing surface, and its base was not encountered within the excavation; the pile was therefore more than 1 m long. A tie-beam (13) was attached to the north-east face of the timber (the method of jointing could not be ascertained) about 0.15 m from its top and appeared to be aligned directly on the fifth fender to the south-east of Tower Stairs. The scantling of the beam was roughly 0.2 m x 0.1 m.

Two stakes/piles (14 and 15) were found together in between structures 10 and 11. The main pile (15) lay 0.8 m to the north-west of masonry 10 and *c* 2.1 m out from the riverside wall. The pile was approximately 0.2 m square and had a tie-beam (16) attached to its north-eastern face, again about 0.15 m down from the top; only the upper face of the beam was exposed, but it was of the same width as the pile. Timber 16 appeared to be aligned on the third fender to the south-east of Tower Stairs, though it was slightly off-line to the east: conceivably it had been attached to the eastern side of the fender or to an earlier version of it (some of the fenders are clearly replacements). The second stake/pile (14) lay immediately to the east of the joint between the first pile and the tie-beam, and may have been intended to strengthen this joint. There was no other immediately obvious explanation for its presence so close to the other timbers. It was slightly smaller (roughly 0.15 m x 0.10 m). A small patch of clay covered the timbers.

Stake/pile 34 was found 1 m out from the riverside wall in the cut-away portion of masonry 11 immediately to the north-east of pile location 9. The timber was 0.15 m square, but only the top 0.1 m was exposed. It did not align with any of the existing fenders, being roughly central between the second and third fenders south-east from Tower Stairs. It seems unlikely that it served the same function as the other two groups of piles and beams.

A group of three re-used timbers were found laid horizontally at pile location 10. The principal timber (27) was oriented north-west to south-east and had a scantling of 0.33 m x 0.23 m; both ends lay beyond the limits of excavation, but it was at least 1.75 m long. There was a 0.5 m-long and 0.1 m deep rebate across the full width of the timber half-way along the exposed length, and an 80 mm-wide slot ran centrally along this right through to the bottom of the timber. There were no peg holes associated with either the rebate or the slot. A second beam (30) was found butted against the north face of 28 and running north-eastward from it at a slight angle from the perpendicular. Only the top surface of this timber was exposed, but its width (0.26 m) suggests that it would have had a similar or identical scantling to timber 29 (see below). Beam 30 continued beyond the limits of excavation, but did not appear in the trench between pile locations 9 and 13; the timber was therefore between 1.8 m and 2.5 m long. The final timber (29) was found

abutting the south face of 28, and this was the only member which was completely exposed.¹ It was 1.8 m long with a scantling of 0.26 m x 0.15 m at the squared north-east end; the south-western end had roughly chamfered edges. Timber 29 was perpendicular but not physically jointed to beam 28. There was a rectangular notch (0.11 m x 0.1 m) cut fully through the centre of the beam's north end (eg where it abutted 28), and an iron bolt protruded from the lower face immediately behind (south of) the notch. All three timbers rested on or were slightly bedded in a mid-brown compact clayey silt with fine gravel (30), probably the same as 19/24/31.

3.2.4 Upper deposits

The upper two deposits were a mixture of brown to very dark brown rubbly sands and gravels (20, 23, 25). These were overlain by the existing sand and gravel foreshore (21, 26).

4 DISCUSSION

4.1 Masonry structures 10 and 11

The masonry structures (10 and 11) were of similar character and construction (including the choice of materials), but the eastern one (10) was more substantial, at least in terms of depth. It is possible that the gap between the two had been caused by subsequent truncation. This was certainly the case at the north-east corner of 10, which had been cut away apparently so that a timber pile could be inserted close in to the curtain wall. On balance, however, and given the limited observations possible in the prevailing conditions, it seems much more likely that the gap was original; the opposing edges of the structures certainly appeared to be as built rather than cut through.

The function of the structures is not clear. They sloped away towards the low water mark, as the current foreshore does, but stopped well short of it. The eastern one abutted the riverside wall, and the western one probably did as well. It is possible that they were connected with the original Tower Stairs, which descended to the foreshore parallel to and alongside the front of the wharf in this approximate position until they were moved and reorientated in the 19th century. It is conceivable that the structures were the foundations for a stair or jetty running out from the original stairs towards low water. This cannot be proved on the basis of the available evidence, and barge-bedding might be an equally plausible interpretation for the structures. These features were hard surfaces provided on the foreshore so that boats could be beached on solid platforms at low tide. They were especially valuable when maintenance work was being carried out on boats. The main problem with this interpretation is extent and, perhaps, materials: barge beds were usually continuous, while structures 10 and 11 seem rather small for the purpose either singly or together; furthermore barge beds usually incorporated very substantial grids of timberwork. Interpretation of the timber structures found during this project is dealt with below, but suffice it to say that only the three beams (27-29) would fit with such an interpretation of 10 and 11. On balance the connection with Tower Stairs seems more plausible, but it must be

¹ Following discussion with English Heritage it was agreed that this timber could be lifted so that pile 10 could be inserted without impediment. This allowed examination of the full profile of the timber. The timber was retained on site and partially reburied in the upper foreshore levels for protection.

admitted that the available data are insufficient for a definitive interpretation either way.

Neither can the date of the structures be determined with certainty except that they are very likely to be pre-Victorian (eg to pre-date the reorientation of Tower Stairs). Equally it seems highly unlikely that they are medieval in date given their height within the foreshore sequence. Excavations in 1986 at the east end of the Tower of London foreshore did not reach pre-Tudor levels within a depth of up to 1.9 m below the existing surface level. A general date range in the later 16th to 18th centuries can be suggested, and the actual date may well be in the latter part of this, but further precision is not possible.

4.2 Timber structures

The timbers were of two distinct types: driven stakes/piles with or without attached tie-beams, and the group of three beams (27-29) laid flat on the foreshore. The stakes/piles appeared to belong to a single phase of activity (with the possible exception of the single pile, 34, which did not appear to have a tie-beam) and are probably associated with the riverside wall or its fronting fenders. The piles on either side of masonry 10 were virtually the same distance out from the wall, and their tie-beams both lined up roughly with one of the fenders. Unfortunately it was not possible to expose the putative joints of the beams and fenders, but there are good reasons why they might be attached: the piles and beams would add strength to the fenders, while the whole ensemble would help to integrate the foreshore deposits close to the river wall. The beams could be seen as a form of barge bedding, although their closeness to the wall makes this an unlikely primary function. The group of three re-used timbers, by contrast, were clearly separate from the wall and represented a discrete entity. Their arrangement, and their discovery at about the same level (relative to the sloping foreshore) as the masonry features, suggests that they belonged to a barge-bed or similar feature for berthing boats on the foreshore at low tide.

The same considerations apply to the date of the timbers as for the masonry structures. They all clearly pre-dated the current Victorian/modern foreshore on stratigraphic grounds, and it is likely that all the timbers were broadly contemporary given that they were exposed at about the same physical horizon. Dendrochronological assessment was rejected both because of the evident reuse of the most accessible timbers (27-29) and because all the timbers appeared to be softwood. English Heritage is currently sponsoring a research programme on the dendrochronological dating of softwoods, but it is still not possible to achieve reliable determinations at the moment (Dr Ian Tyers pers comm). As with the masonry, therefore, a general post-medieval date is the most that can be suggested for the timbers exposed during this project.

4.3 Local variability of deposits

There was some variation in the character of the foreshore deposits, even over quite short distances. The proportion of rubble in the generally sandy, coarse gravel make-up was particularly variable. This is not thought to have major significance but probably results from localised dumping patterns during the establishment of the shingle foreshore we see today. This is largely a Victorian and modern construction, overlying earlier levels. The lower (and therefore earlier) deposits seen in the deepest areas of excavation are likely to date to the late medieval and post-medieval periods, but more specific dating is impossible due to the paucity of reliable finds assemblages and the limited nature of the observations.

CONCLUSIONS

The archaeological monitoring of several stages of work during the investigation and construction of piles for the new Tower Pier bankseat was successful in recording a number of structures and features associated with the historic use of the Tower of London's foreshore. The unavoidable impact of the piling works on the archaeology was mitigated by careful observation and recording of work at pile location 9, and the removal of one timber from pile location 10.

ACKNOWLEDGEMENTS

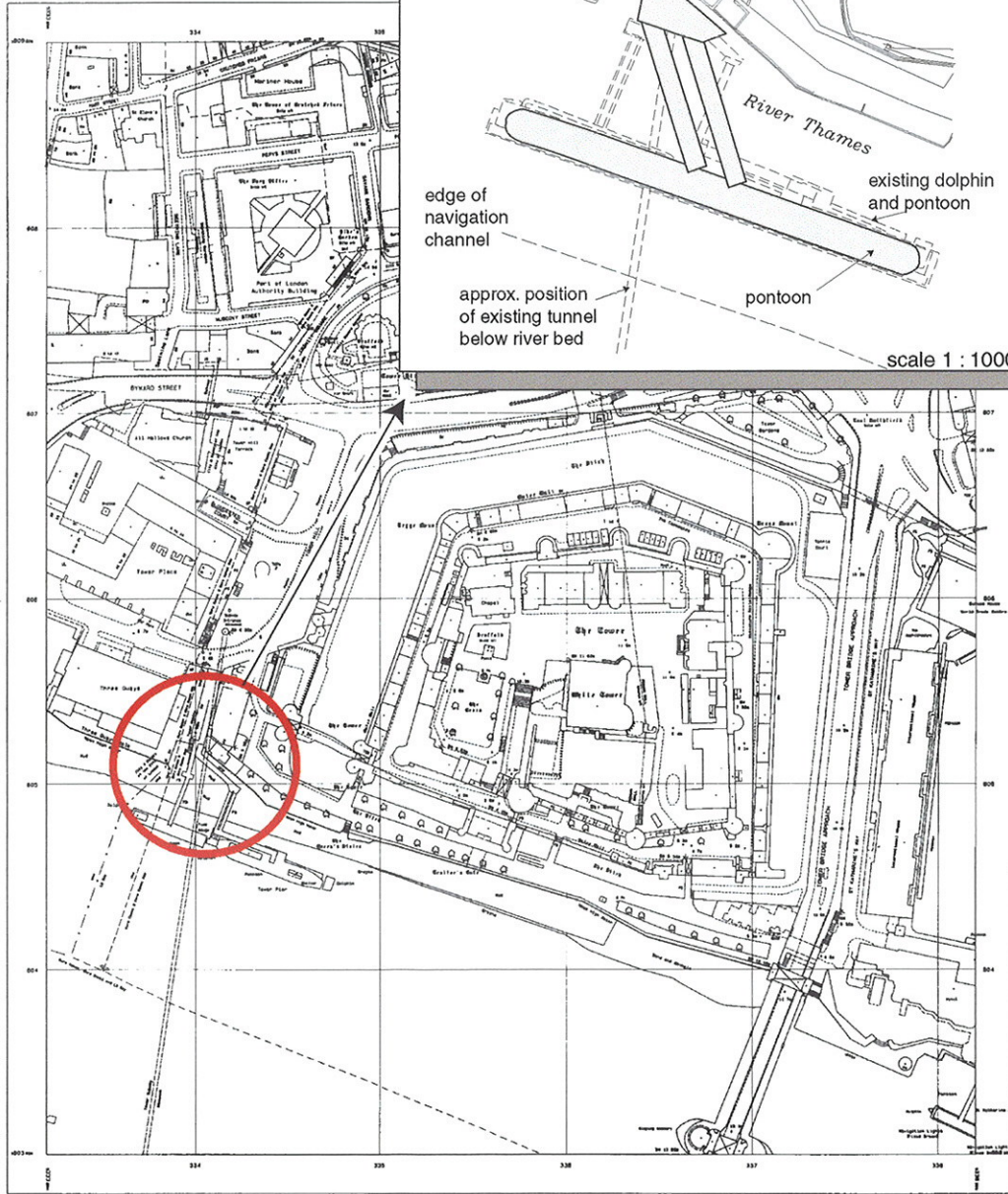
I am grateful to Nick Truckle and Ken Whittaker of English Heritage, and Bob Naish of Mouchel Consulting Ltd, for their help, advice and support throughout the fieldwork. The site staff of Costain, the building contractor, also provided invaluable practical assistance and worked closely with the archaeological team throughout. I am also grateful to Mike Hill and Andrew McKay from the Port of London Authority for their support as client at all stages from appraisal through to fieldwork.

APPENDIX 1: WATCHING BRIEF/EXCAVATION CONTEXT RECORD

Cxt	Type	Brief description	Strat ov	Strat und
1	Deposit	Loose mid-brownish grey sandy gravel - foreshore	2	
2	Deposit	Loose dark grey sand, rubble & gravel mix	3	1
3	Deposit	Loose mid-light grey silty sand	4	2
4	Structure	Rough conglomeration of brick, flint, stone & mortar	3	
5	Deposit	Loose light brown sandy gravel - foreshore	6	
6	Deposit	Loose dark grey silty sand	4	7
7	Deposit	Loose very dark grey sandy clay, a little rubble present	6	5
8		NOT ASSIGNED		
9		NOT ASSIGNED		
10	Structure	Eastern of two areas of stone rubble in hard mortar	Unclear	19
11	Structure	Western of two areas of stone rubble in hard mortar	31	24
12	Structure	Timber stake driven into foreshore & attached to 13	17 or 18	13
13	Structure	Timber tie-beam from 12; runs SW-NE, may join fender 5	12	19 or 18
14	Structure	Eastern of two timber stakes driven into foreshore	31	22
15	Structure	Western of two stakes, attached to 16	31	16
16	Structure	Timber tie-beam from 15; runs SW-NE, may join fender 3	15	22
17	Deposit	Clay layer at base of excavation, pile 13	-	18
18	Deposit	Rubble, clay & gravel layer over 17	17	19
19	Deposit	Loose very dark brown gravel	18	20
20	Deposit	Loose brown gravel & rubble mixture	19, 30	21
21	Deposit	Loose mid-brownish grey gravel - foreshore	20	
22	Deposit	Layer of clay sealing timber 16	14, 16	24
23	Deposit	Fairly loose very dark brown gravel & rubble	30	21/26
24	Deposit	Loose very dark grey sandy clay	16	25
25	Deposit	Loose dark grey silty sand with some rubble	24	26
26	Deposit	Loose brown sandy gravel - foreshore	25	
27	Structure	NW-SE timber, re-used, with 28 & 29 abutting	-	28, 29
28	Structure	NE-SW timber, re-used, abutting N side of 27	27	30
29	Structure	NE-SW timber, re-used, abutting S side of 27	27	30
30	Deposit	Mid-brown compact clayey silt with fine gravel	28, 29	23
31	Deposit	Mid-brown compact clayey silt	32	11
32	Deposit	Fairly compact layer of chalk found in sondage at pile 9	31	33
33	Deposit	Clean compact brown clay - London Clay redeposited?	-	32
34	Structure	Isolated stake found in gap cut into north side of masonry 10	24	25

Superplan...

Option 1



scale 1 : 1000

scale 1 : 2000

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— proposed pontoon

- - - existing structure

figure 1 : site location

TOWER PIER PROJECT

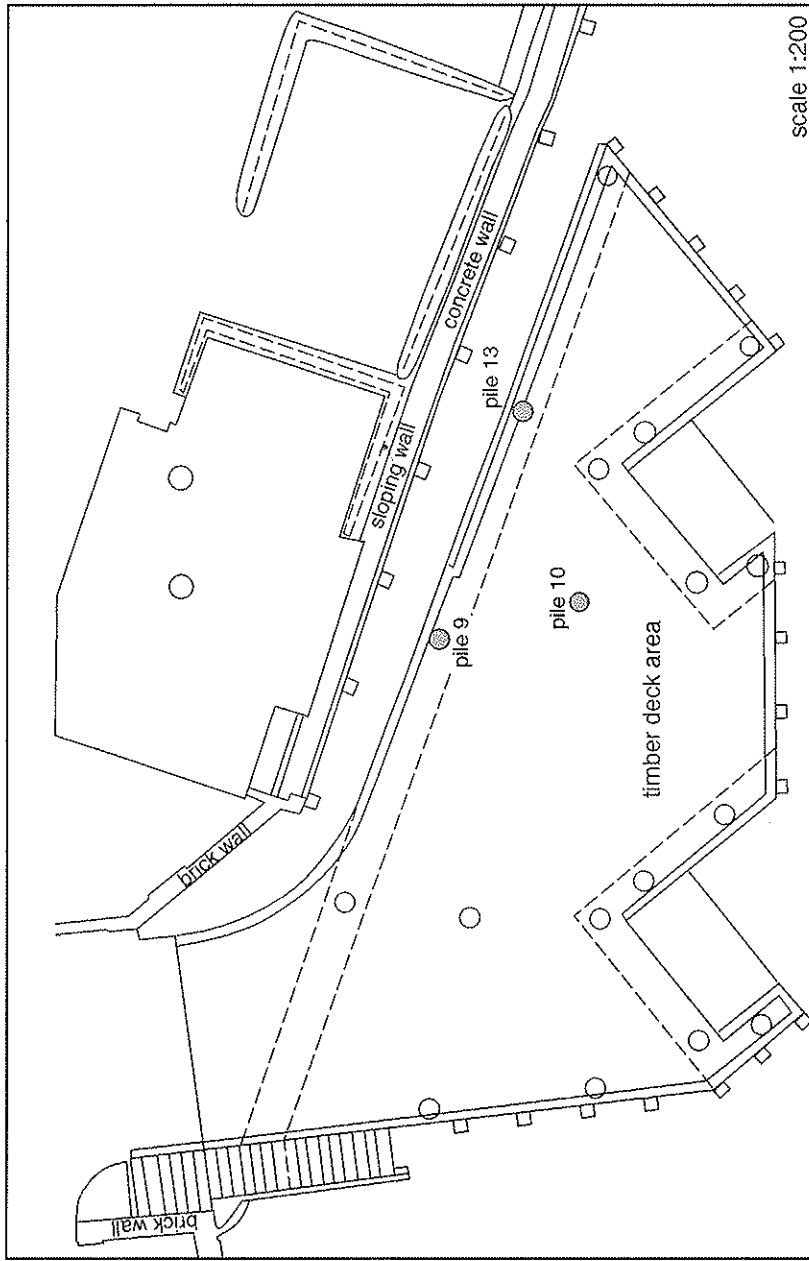


figure 2 : position of piles

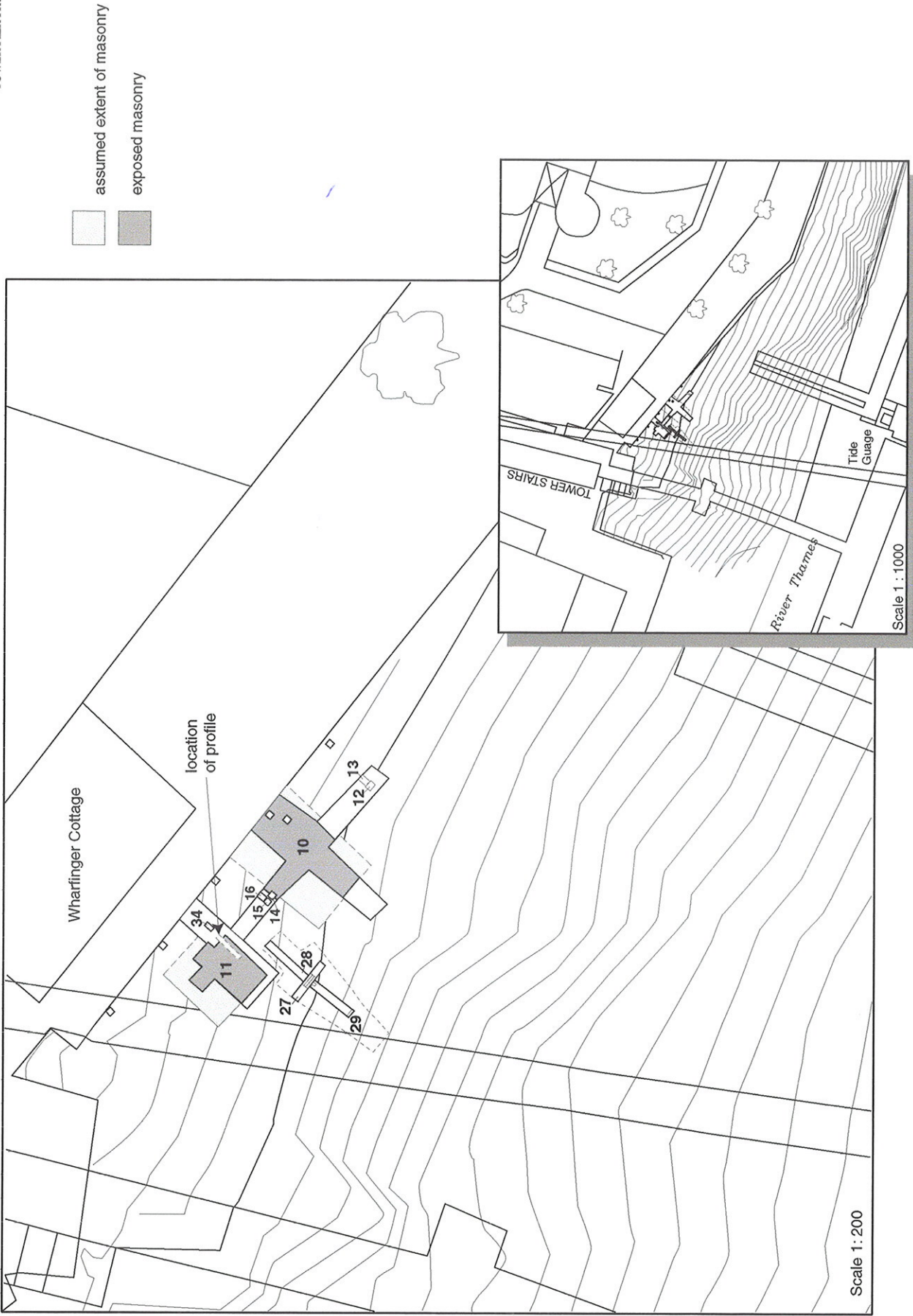
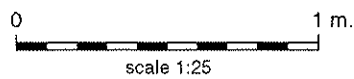
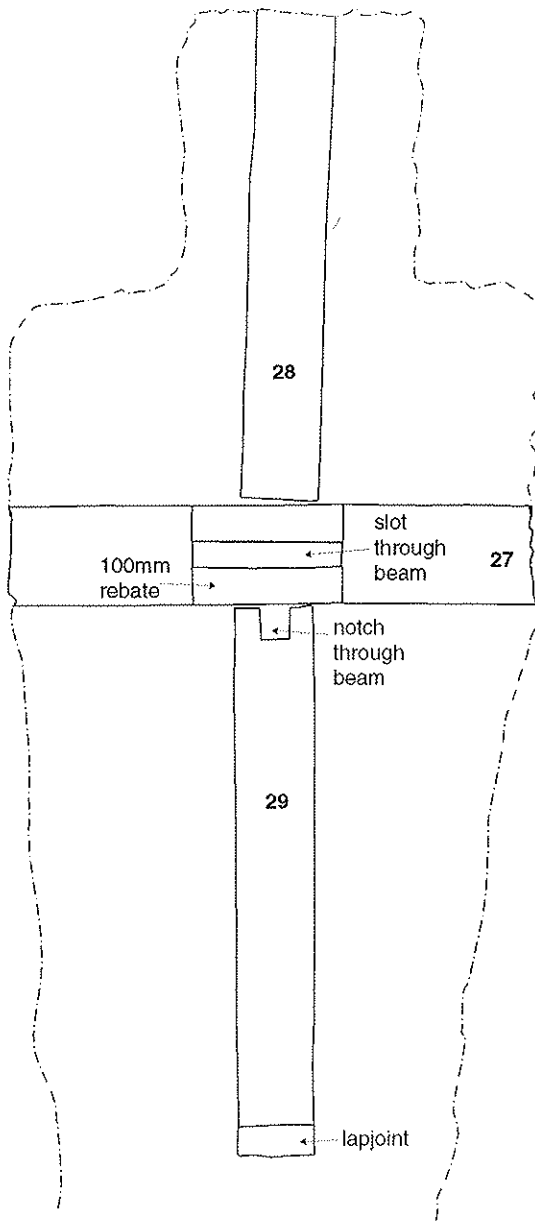


figure 3: location of main excavation and features.

Plan of timber detail at pile location 10



Measured sketch profile of soils revealed by deep mechanical excavation at pile location 9

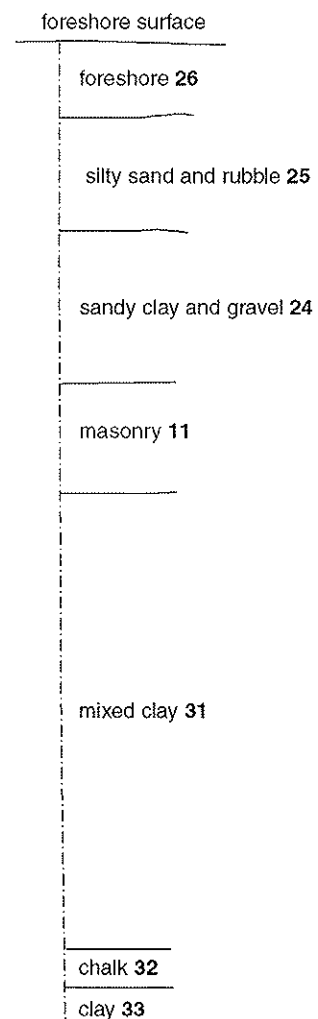


figure 4 : archaeological detail from pile locations 9 and 10



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