THE ADELPHI BUILDING
JOHN ADAM STREET
LONDON WC2
CITY OF WESTMINSTER

ASSESSMENT OF AN ARCHAEOLOGICAL EXCAVATION

JAD 14

MAY 2015

PRE-CONSTRUCT ARCHAEOLOGY

DOCUMENT VERIFICATION

THE ADELPHI BUILDING
JOHN ADAM STREET
LONDON WC2
CITY OF WESTMINSTER

EXCAVATION

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AN ARCHAEOLOGICAL WATCHING BRIEF AND EXCAVATION AT THE ADELPHI BUILDING, JOHN ADAM STREET, LONDON WC2N 6BJ

Local Planning Authority: Westminster City Council

Planning Ref: 13/03399/FUL

Site Code: JAD14

Central National Grid Reference: TQ 3041 8059

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1 Abstract

1.1 The initial phase of work conducted by Pre-Construct Archaeology Ltd at the Adelphi Building, John Adam Street, City of Westminster, consisted of a watching brief undertaken during the programme of refurbishment and alterations between the 20th of January and 28th of February 2014. The first elements of work monitored were a number of small geotechnical test pits. This was followed by the archaeological excavation of a more substantial rectangular pit designed to house a lift shaft. The latter took place between the 4th of March and 10th of May 2014.

1.2 The work was carried out in the basement car-parking area of the Adelphi Building in order to fulfil a condition placed on planning consent for the site works.

1.3 The initial monitoring exercise demonstrated that there was considerable potential for archaeological survival below the basement slab of the building. One test pit uncovered a massive chalk and flint foundation which probably formed part of Durham House, a palatial complex used by the Bishops of Durham as their London residence from the late 13th century onward. Apart from the chalk foundation mentioned above, which was almost certainly late medieval or post-medieval in date, the monitoring of the geotechnical test pits located in the western part of the basement also demonstrated the presence of organic archaeological deposits. No datable artefacts were recovered from these layers apart from fragments of Roman roof tile which were almost certainly residual. However, given the presence of the chalk and flint foundation and the level at which these deposits were encountered it was clear that they were likely to date to the medieval period or earlier.

1.4 The excavation undertaken in the lift pit revealed a remarkable sequence of deposits and timber structures which dated to the Middle Saxon period. Four lines of timberwork were documented all of which represented management along the edge of the natural bank rather than land reclamation into the channel of the Thames. The earliest timber structures are likely to date to the first half of the seventh century AD. Above the waterfront dumping and levelling deposits associated with Saxon timber waterfront structures were elements of an earlier structure, possibly parts of a timber building, which had been impacted by pits and ditches also of Saxon date and contained considerable quantities of domestic waste. The latest Saxon layers consisted of yard or road surfaces which dated to the late 8th or early 9th centuries.

1.5 Post-medieval activity consisted of structural remains possibly associated with Durham House which included a chalk foundation and a series of large postholes.

2 Introduction

2.1 Between the 30th of January and 28th of February 2014 Pre-Construct Archaeology Ltd. (PCA) carried out an archaeological watching brief at the Adelphi Building, John Adam Street, City of Westminster WC2N 6BJ. This work involved the monitoring of three small test pits the principal purpose of which was to supply geotechnical information regarding the construction of the basement foundations and slab. A considerably larger pit designed to accommodate the base of a lift shaft was excavated archaeologically between the 4th of March and 10th of May 2014. The lift pit measured 3.50m east-west by 4.30m north south and extended 1.80m below the top of the existing basement slab (Figs. 1, 2a & 2b).

2.2 The upper level of the site, which lies on the steep escarpment that runs southward toward the Thames from the Strand, is bordered by Robert Street to the west, John Adam Street to the north and Adam Street to the east. The southern side of the building is freestanding and overlooks the Thames at this level. At the lower level the southern boundary of the site lies adjacent to Savoy Place which is located to the north of the Victoria Embankment Gardens. A large but relatively shallow basement, now used predominantly as a car park, covers most of the footprint of the site.

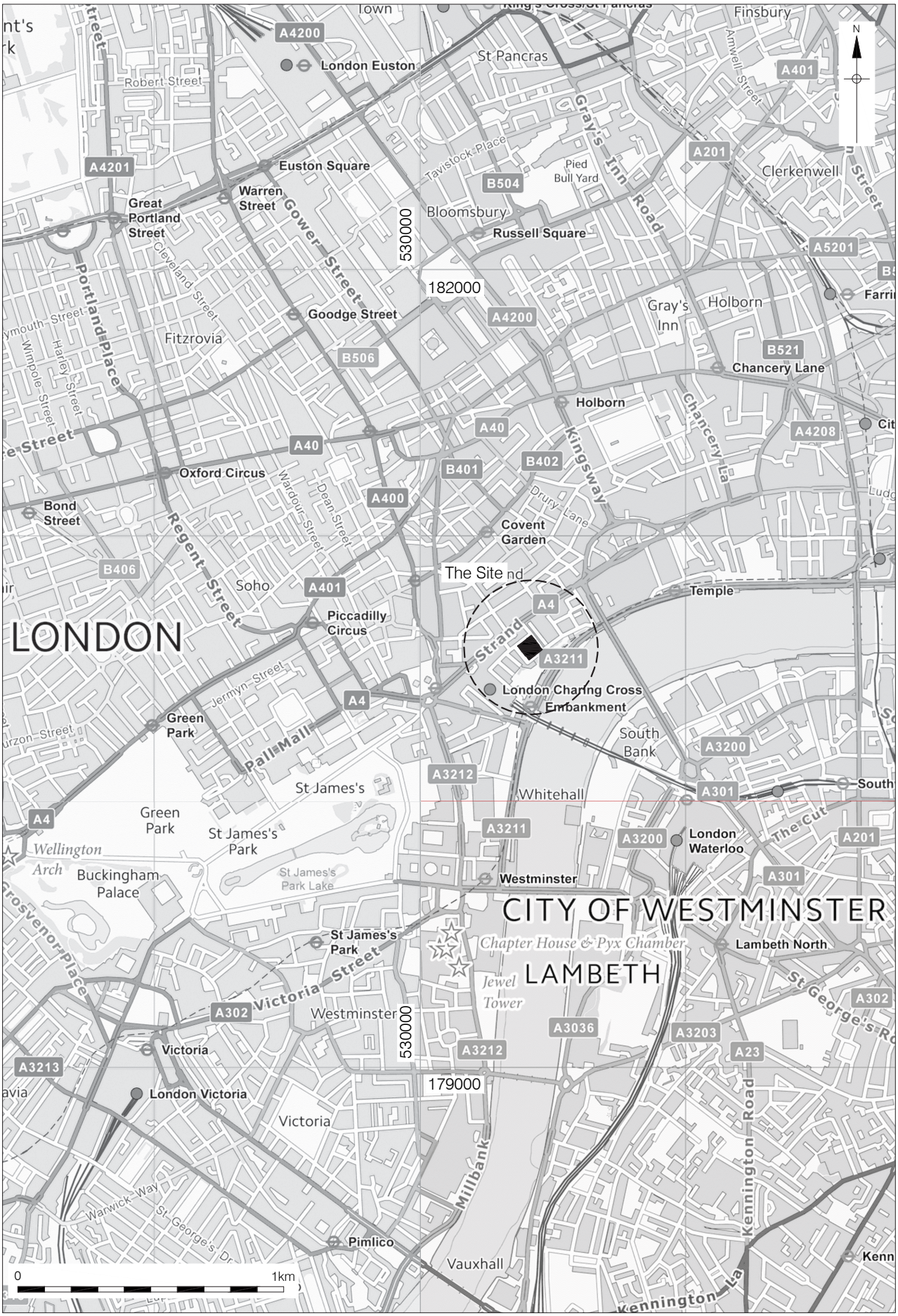
2.3 The central natural grid reference for the site is TQ 3041 8059.

2.4 The site was given the unique Museum of London site code JAD14.

2.5 The site had previously been the subject of an Archaeological Desk Based Assessment (Meager 2013a).

2.6 The building is currently undergoing a programme of alterations and refurbishments, which are being carried out in accordance with the conditional planning consent that was granted for the works by the City of Westminster (Planning Ref. 13/03399/FUL). One of the planning conditions (29) was for a programme of archaeological work to be carried out during certain aspects of the programme.

2.7 The project was monitored for English Heritage GLAAS, in its capacity as advisors to the City of Westminster Council, initially by Sandy Kidd and later by Diane Walls. The archaeological works were managed by Tim Bradley for PCA. The geotechnical investigation was monitored by Peter Boyer whilst the excavation of the lift pit trench was supervised by Douglas Killock



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19/05/15 JS

Figure 1
Site Location
1:20,000 at A4

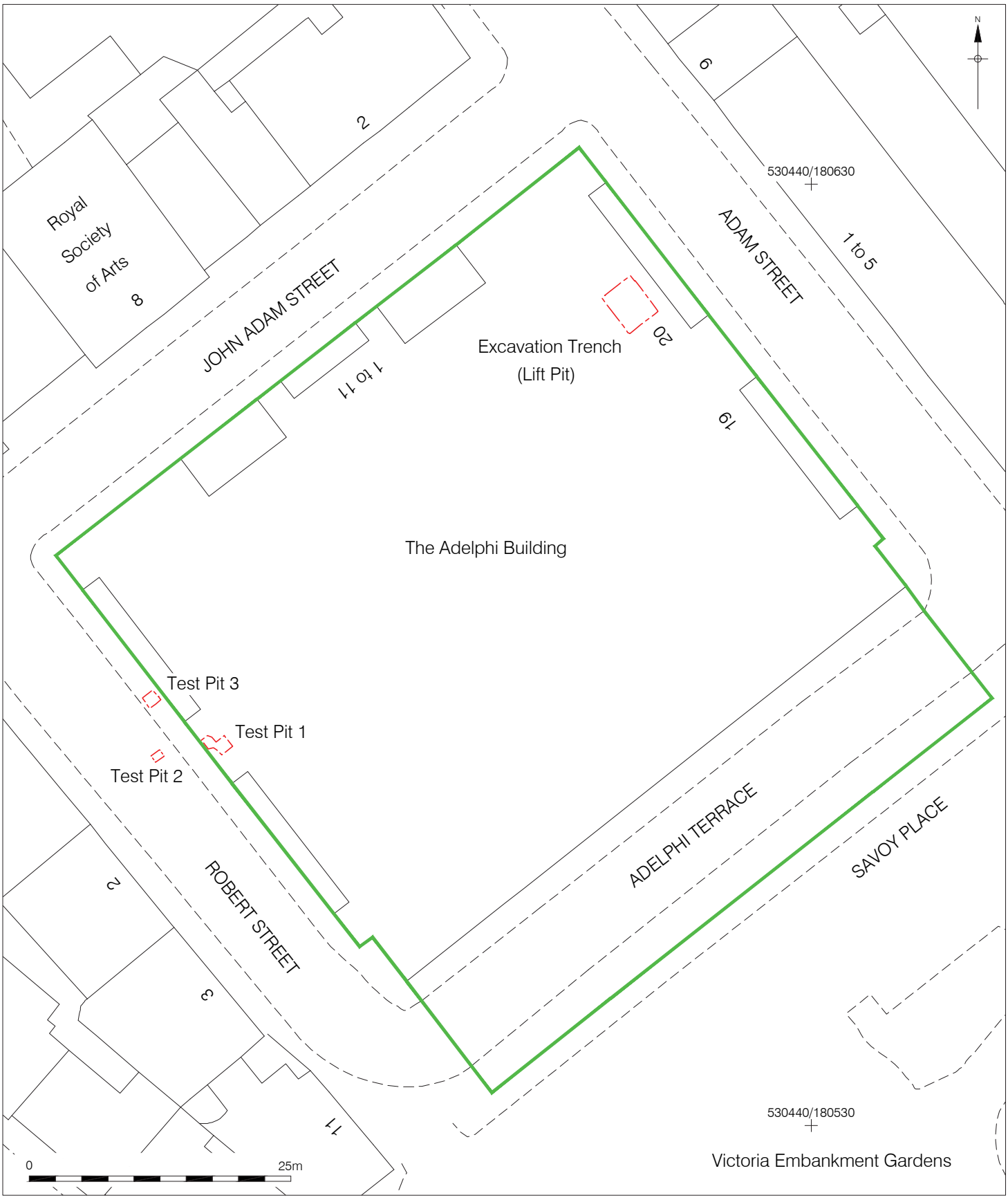

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Figure 2a
Trench Location
1:500 at A4

19/05/15 JB & JS

Figure 2b
Trench Location within basement
1:500 at A4

3 Planning Background

3.1 The development of the site is subject to planning guidance and policies contained within the National Planning Policy Framework (NPPF), The London Plan and policies of The City of Westminster, which fully recognises the importance of the buried heritage for which it is the custodian.

3.2 In March 2012, the government published the National Planning Policy Framework (NPPF), which replaced existing national policy relating to heritage and archaeology (Planning Policy Statement 5: Planning for the Historic Environment (PPS5)). In summary, current national policy provides a framework which protects nationally important designated Heritage Assets and their settings, in appropriate circumstances seeks adequate information (from desk based assessment and field evaluation where necessary) to enable informed decisions regarding the historic environment and provides for the investigation by intrusive or non-intrusive means of sites not significant enough to merit *in-situ* preservation. Relevant paragraphs within the NPPF include the following:

128. *In determining applications, local planning authorities should require an applicant to describe the significance of any heritage assets affected, including any contribution made by their setting. The level of detail should be proportionate to the assets' importance and no more than is sufficient to understand the potential impact of the proposal on their significance. As a minimum the relevant historic environment record should have been consulted and the heritage assets assessed using appropriate expertise where necessary. Where a site on which development is proposed includes or has the potential to include heritage assets with archaeological interest, local planning authorities should require developers to submit an appropriate desk-based assessment and, where necessary, a field evaluation.*

129. *Local planning authorities should identify and assess the particular significance of any heritage asset that may be affected by a proposal (including by development affecting the setting of a heritage asset) taking account of the available evidence and any necessary expertise. They should take this assessment into account when considering the impact of a proposal on a heritage asset, to avoid or minimise conflict between the heritage asset's conservation and any aspect of the proposal.*

132. *When considering the impact of a proposed development on the significance of a designated heritage asset, great weight should be given to the asset's conservation. The more important the asset, the greater the weight should be. Significance can be harmed or lost through alteration or destruction of the heritage asset or development within its setting. As heritage assets are irreplaceable, any harm or loss should require clear and convincing justification. Substantial harm to or loss of a grade II listed building, park or garden should be exceptional. Substantial harm to or loss of designated heritage assets of the highest significance, notably scheduled monuments, protected wreck sites, battlefields, grade I and II* listed buildings, grade I and II* registered parks and gardens, and World Heritage Sites, should be wholly exceptional.*

135 *The effect of an application on the significance of a non-designated heritage asset should be taken into account in determining the application. In weighing applications that affect directly or indirectly non designated heritage assets, a balanced judgement will be required having regard to the scale of any harm or loss and the significance of the heritage asset.*

139. *Non-designated heritage assets of archaeological interest that are demonstrably of equivalent significance to scheduled monuments, should be considered subject to the policies for designated heritage assets.*

141. *Local planning authorities should make information about the significance of the historic environment gathered as part of plan-making or development management publicly accessible. They should also require developers to record and advance understanding of the significance of any heritage assets to be lost (wholly or in part) in a manner proportionate to their importance and the impact, and to make this evidence (and any archive generated) publicly accessible. However, the ability to record evidence of our past should not be a factor in deciding whether such loss should be permitted.*

3.3 The Glossary contained within the NPPF includes the following definitions:

Heritage asset: A building, monument, site, place, area or landscape identified as having a degree of significance meriting consideration in planning decisions, because of its heritage interest. Heritage asset includes designated heritage assets and assets identified by the local planning authority (including local listing).

Archaeological interest: There will be archaeological interest in a heritage asset if it holds, or potentially may hold, evidence of past human activity worthy of expert investigation at some point. Heritage assets with archaeological interest are the primary source of evidence about the substance and evolution of places, and of the people and cultures that made them.

Historic environment: All aspects of the environment resulting from the interaction between people and places through time, including all surviving physical remains of past human activity, whether visible, buried or submerged, and landscaped and planted or managed flora.

Historic environment record: Information services that seek to provide access to comprehensive and dynamic resources relating to the historic environment of a defined geographic area for public benefit and use.

3.4 The London Plan, published July 2011, includes the following policy regarding the historic environment in central London, which should be implemented through the Local Development Framework (LDF) being compiled at the Borough level:

POLICY 7.8 HERITAGE ASSETS AND ARCHAEOLOGY

Strategic

A London's heritage assets and historic environment, including listed buildings, registered historic parks and gardens and other natural and historic landscapes, conservation areas, World Heritage Sites, registered battlefields, scheduled monuments, archaeological remains and memorials should be identified, so that the desirability of sustaining and enhancing their significance and of utilising their positive role in place shaping can be taken into account.

B Development should incorporate measures that identify, record, interpret, protect and, where appropriate, present the site's archaeology.

Planning decisions

C Development should identify, value, conserve, restore, re-use and incorporate heritage assets, where appropriate.

D Development affecting heritage assets and their settings should conserve their significance, by being sympathetic to their form, scale, materials and architectural detail.

E New development should make provision for the protection of archaeological resources, landscapes and significant memorials. The physical assets should, where possible, be made available to the public on-site. Where the archaeological asset or memorial cannot be

preserved or managed on-site, provision must be made for the investigation, understanding, recording, dissemination and archiving of that asset.

LDF preparation

F Boroughs should, in LDF policies, seek to maintain and enhance the contribution of built, landscaped and buried heritage to London's environmental quality, cultural identity and economy as part of managing London's ability to accommodate change and regeneration.

3.5 The local planning authority responsible for the study site is the City of Westminster whose Unitary Development Plan (UDP) is to be shortly replaced with the LDF Core Strategy adopted in January 2011. Meanwhile, the majority of policies of the UDP have been saved pending the full introduction of the LDF, including most of those relating to the historic environment:

POLICY DES 9: CONSERVATION AREAS

Aim

10.108 To preserve or enhance the character or appearance of conservation areas and their settings.

POLICY DES 9: CONSERVATION AREAS

(A) Applications for outline planning permission in conservation areas

In the case of outline planning applications within designated conservation areas it may be necessary to require additional details to be produced in order that the physical impact of the proposed development may be fully assessed.

(B) Planning applications involving demolition in conservation areas

1) Buildings identified as of local architectural, historical or topographical interest in adopted conservation area audits will enjoy a general presumption against demolition

2) Development proposals within conservation areas, involving the demolition of unlisted buildings, may be permitted

a) If the building makes either a negative or insignificant contribution to the character or appearance of the area, and/or

b) If the design quality of the proposed development is considered to result in an enhancement of the conservation area's overall character or appearance, having regard to issues of economic viability, including the viability of retaining and repairing the existing building

3) In any such case, there should also be firm and appropriately detailed proposals for the future viable redevelopment of the application site that have been approved and their implementation assured by planning condition or agreement.

(C) Planning application for alteration or extension of unlisted buildings

Planning permission will be granted for proposals which

1) Serve to reinstate missing traditional features, such as doors, windows, shopfronts, front porches and other decorative features

2) Use traditional and, where appropriate, reclaimed or recycled building materials

3) Use prevalent facing, roofing and paving materials, having regard to the content of relevant conservation area audits or other adopted supplementary guidance

4) In locally appropriate situations, use modern or other atypical facing materials or detailing or innovative forms of building design and construction

(D) Conservation area audits

The existence, character and contribution to the local scene of buildings or features of architectural, historical or topographical interest, recognised as such in supplementary planning guidance, such as conservation area audits, will be of relevance to the application of policies DES 4 to DES 7, and DES 10.

(E) Changes of use within conservation areas

Permission will only be granted for development, involving a material change of use, which would serve either to preserve or enhance the character and appearance of the conservation area, bearing in mind the detailed viability of the development.

(F) Setting of conservation areas

Development will not be permitted which, although not wholly or partly located within a designated conservation area, might nevertheless have a visibly adverse effect upon the area's recognised special character or appearance, including intrusiveness with respect to any recognised and recorded familiar local views into, out of, within or across the area.

(G) Restrictions on permitted development in conservation areas

1) In order to give additional protection to the character and appearance of conservation areas, directions may be made under article 4(2) of the Town and Country Planning (General Permitted Development) Order 1995. Types of generally permitted development to which such directions may apply will include:

a) painting, cladding or rendering of building facades

b) insertion or replacement of doors and windows

c) removal or replacement of boundary walls and fences

d) alteration of roof profiles and replacement of roofing materials.

2) Such added powers of planning control may be applied to designated conservation areas the subject of adopted conservation area audits or to buildings or groups of buildings therein identified as being of architectural, historical or topographical interest.

3) The existence of such directions will be taken into account in the authorisation of development that may itself be made subject to the removal of permitted development rights, in appropriate individual cases.

Policy application

10.109 The successful integration of new developments, alterations or extensions depends on detailing as well as scale and massing. Therefore, applications for outline permission for development will not be considered. Applicants will be required to provide sufficient information about proposed development to enable its effect on the character and appearance of the conservation area to be properly assessed.

10.110 In all cases the City Council will expect applications to provide sufficient information about the proposed development and its immediate setting to enable the effect of the proposal on the character and appearance of the conservation area to be properly and fully assessed. The City Council will consult local amenity societies and, when appropriate, national amenity societies, English Heritage and the Commission for Architecture and the Built Environment when major development is proposed in conservation areas.

10.111 Many buildings, both listed and unlisted, contribute to the character or appearance of conservation areas. There are others, which make little or no contribution and which could be replaced with suitable new developments. The City Council will encourage the redevelopment of unattractive buildings that have a negative effect upon the character and appearance, and setting, of conservation areas. All proposals for new developments will be considered in the light of their effect on the character and appearance or setting of the conservation area. High quality modern architecture will be acceptable in conservation areas provided that it can be demonstrated that it is sensitively designed in response to its conservation area context and will preserve or enhance the character and appearance of the conservation area.

10.112 In assessing proposals for the demolition of a building which makes a positive contribution to the character and appearance of a conservation area (as identified in conservation area audits), the City Council will apply the tests set out in PPG 15: Planning and the Historic Environment, paragraphs 3.15 to 3.19. Where a conservation area audit has yet to be published, the City Council will assess the merits of an existing building and its contribution to the conservation area with respect to the advice set out in guidance produced by the Government and English Heritage. In particular the City Council will assess the economic viability of retaining and refurbishing the existing building, and the relative contribution of the existing building and the anticipated contribution of proposed building to the character and appearance of the conservation area. In making this assessment the contribution of the existing and proposed uses to the character or appearance of the conservation area will be considered.

10.113 In some cases complete demolition behind the facade may be acceptable, but it may be necessary to maintain the scale of the original rooms on the main floors of the principal facades

in order to preserve the appearance and integrity of the building, particularly at night. The Council will also require applicants to demonstrate that the stability and architectural integrity of those parts of the building to be retained are adequately safeguarded both during the course of reconstruction work and afterwards. For this reason, the City Council considers that most traditional cellular buildings of the eighteenth and nineteenth centuries, originally built for domestic purposes, are unsuitable for major structural change or partial demolition. Commercial buildings with basic purpose-built framed structures, dating from the late nineteenth century onwards, are more adaptable in this respect.

10.114 When conservation area consent is granted for demolition it will normally be concurrent with planning permission for new development. Appropriate conditions will be attached to the conservation area consent so that demolition cannot proceed without development proceeding immediately afterwards, as part of a continuous process. This is to prevent vacant sites being created, which would adversely affect the character and appearance of conservation areas. Furthermore, the City Council may add conditions on a consent for demolition and redevelopment requiring the salvage and reuse of materials from the building to be demolished.

10.115 Alterations and extensions to buildings in conservation areas should preserve or enhance the character or appearance of the area. Views from surrounding buildings and other non street-level views may be important.

10.116 Shopfronts make an important contribution to the character and appearance of many conservation areas. The installation of new shopfronts may provide opportunities to enhance conservation areas and the City Council will expect new shopfronts to make a significant, positive contribution to the conservation area.

10.117 In almost all circumstances, the removal of original shopfronts will not be acceptable. The City Council may seek to protect non-original shopfronts which make a significant contribution to the conservation area.

10.118 The replacement of traditional windows with non-traditional materials such as aluminium or uPVC, or with inappropriate designs, will not normally be acceptable. The inappropriate use of modern roofing or recladding materials may also adversely affect the character and appearance of the conservation area. In general, all alterations and extensions should be carried out in materials to match existing or in keeping with the character and appearance of the conservation area. In some exceptional circumstances, modern or atypical materials, detailing or innovative design may be acceptable. However, such departures from normal policy will need to be fully justified in terms of their impact on the conservation area.

10.119 In addition to visual quality, the uses that are associated with particular buildings and conservation areas are vitally important to the character of those areas. In some cases the uses are important contributory factors to an area's character; in other cases they actually create that character or have long historic or functional relationships. In Covent Garden, for example, the character, scale and diversity of both buildings and uses are important to its economic success and its attractiveness to residents and visitors.

10.120 In considering applications involving change of use the City Council will consider the contribution of existing and proposed uses to the character or appearance of the conservation area.

10.121 The boundaries of some conservation areas may include areas of marginal architectural quality where new developments should be carefully controlled. Development outside but adjacent to conservation areas can have a significant impact on the setting of conservation areas. New development in such areas should take into account and respect the character and appearance of neighbouring conservation areas in order to safeguard their setting.

10.122 In line with its statutory duty, the City Council will from time to time, formulate and publish assessments and proposals for all fifty-four conservation areas in the City. Conservation area audits will be produced for each conservation area, giving a full and detailed assessment of the area’s character and appearance. Appendix 10.3 gives details of the progress made in preparing these audits.

10.123 As work on the care and protection of conservation areas proceeds, it will be appropriate to initiate schemes for the improvement of parts of the areas. The enhancement of open spaces, and especially streets, by tree planting, schemes for painting facades, and other improvements, can all bring considerable benefit. Some of these schemes may be initiated by the City Council, as local planning and highway authority. Others may be at the instigation of local residents, owners or amenity societies.

10.124 The City Council may take other steps to secure the preservation and enhancement of its conservation areas. It may serve notices under s215 of the Town and Country Planning Act 1990 to require owners or occupiers to carry out works to repair buildings or improve neglected land which is adversely affecting amenity.

10.125 It may also issue Article 4 directions to remove permitted development rights from properties in areas threatened with insensitive alterations, which would normally be beyond the City Council's control. Appendix 10.2 provides a list of Article 4 directions in Westminster.

10.126 The City Council has published supplementary planning guidance with respect to its conservation area policies. This is set out in „Development and Demolition in Conservation Areas" (1996). Many of the City Council's other supplementary planning guidance leaflets referred to in this chapter contain advice relevant to the design of new development in conservation areas.

Reasons

10.127 National policy on aesthetic control is set out in paragraphs 33 to 39 of PPS 1: Delivering Sustainable Development. It expects local planning authorities should plan positively for the achievement of high quality and inclusive design for all development, including individual buildings, public and private spaces and wider area development schemes. Section 69 of the Planning (Listed Buildings and Conservation Areas) Act 1990 imposes a duty on local planning authorities to designate as conservation areas any 'areas of special architectural or historic interest the character or appearance of which it is desirable to preserve or enhance'.

10.128 The City Council considers that areas of Westminster of significant townscape quality or with a distinctive character are worthy of preservation and enhancement. They are individually important and collectively contribute to the character of the City. Not only are conservation areas important locally, but there are a number which are also valued for their metropolitan and national significance. The Palace of Westminster, St. Margaret's and Westminster Abbey comprise one of twenty-six sites in the United Kingdom inscribed by the World Heritage Committee as a „world heritage site". Other areas such as Whitehall, Trafalgar Square, the River Thames and the riverside area, the legal precinct around the Royal Courts of Justice, Westminster Abbey and Parliament Square are at the heart of London and their special character and importance will be preserved and enhanced for national as well as local reasons. Since the Civic Amenities Act 1967 first conferred powers requiring local authorities to designate conservation areas, many such areas of special architectural or historic interest and character have been designated in Westminster.

DES 11: SCHEDULED ANCIENT MONUMENTS, AREAS AND SITES OF ARCHAEOLOGICAL PRIORITY AND POTENTIAL

Aim

10.147 To identify archaeological remains of national and local importance, conserve them in their settings, and provide public access to them. Where new development is proposed on sites of archaeological potential, to ensure adequate archaeological impact assessment, followed by appropriate provision for preservation or investigation, recording, and publication.

POLICY DES 11: SCHEDULED ANCIENT MONUMENTS, AREAS AND SITES OF ARCHAEOLOGICAL PRIORITY AND POTENTIAL

(A) Scheduled Ancient Monuments

Permission for proposals affecting the following Scheduled Ancient Monuments, or their settings, will be granted providing that their archaeological value and interest is preserved:

1) the Chapter House and Pyx Chamber in the Cloisters, Westminster Abbey

2) the Jewel Tower.

(B) Areas and Sites of Special Archaeological Priority and Potential

Permission will be granted for developments where, in order of priority:

1) all archaeological remains of national importance are preserved in situ

2) remains of local archaeological value are properly, evaluated and, where practicable, preserved in situ

3) if the preservation of archaeological remains in situ is inappropriate, provision is made for full investigation, recording and an appropriate level of publication by a reputable investigating body.

Policy application

10.148 There are three categories of archaeological remains. In order of importance they are:

a) Scheduled Ancient Monuments: nationally important remains which are scheduled under the Ancient Monuments and Archaeological Areas Act 1979

b) Areas of Special Archaeological Priority: areas rich in archaeological remains, where ground works are likely to reveal archaeological remains

c) Sites of Archaeological Significance and Potential: areas where archaeological remains are known or thought likely to exist.

10.149 These locations are listed in the Sites and Monuments Record maintained by English Heritage. The Areas of Special Archaeological Priority are *Lundenwic* and Thorney Island; Paddington and Lillestone Villages; Marylebone Village; Tyburn Settlement and Ebury Village. The archaeological data produced by the Museum of London and English Heritage provide more detailed information, including further sites and areas of archaeological significance and potential within Westminster. Areas of Special Archaeological Priority are illustrated on Maps 10.3-10.7. Information on these and other sites of archaeological priority and potential are available from the Greater London sites and monuments record maintained by English Heritage.

10.150 In considering applications for development of land with archaeological potential, the City Council will require an archaeological assessment detailing the potential impact of development upon surviving archaeological remains. Should archaeological evaluation and investigations be required, it must be undertaken in accordance with a written scheme of investigation approved by the City Council. The Greater London Archaeology Advisory Service provides guidance papers detailing these procedures. With respect to policy DES 11 B (3), investigation may include a watching brief and, or, a full excavation.

10.151 The City Council will seek professional archaeological advice as appropriate and will encourage applicants proposing development to do the same. Where development may affect land of archaeological priority or potential, the City Council will expect applicants to have properly assessed and planned for the archaeological implications of their proposals. In this way the Council and the applicant will have sufficient information upon which an informed planning decision, incorporating appropriate archaeological safeguards, may be based. Such safeguards normally consist of design measures to ensure the permanent preservation of archaeological remains in situ or, where that is not appropriate, archaeological rescue investigations in advance of development. The results and finds from archaeological investigations also need to be analysed, interpreted, presented to the public and curated for future use. Attention is drawn to the advice contained within the code of practice prepared by the British Archaeologists' and Developers Liaison Group.

Reasons

10.152 Archaeological remains are important evidence of the City's past and are a valuable historical, educational and tourist resource. They are finite and fragile; once lost, they cannot be recovered. The City Council considers that the archaeology of Westminster is a national as well as a local asset and that its preservation is a legitimate objective, against which the needs of development must be carefully balanced and assessed. The destruction of such remains should be avoided wherever possible and should never take place without prior archaeological excavation and record.

10.153 The most important archaeological remains are scheduled and are protected under the Ancient Monuments and Archaeological Areas Act 1979. Where works to such sites and their setting are proposed, including repair, scheduled ancient monument consent is required.

10.154 The London Plan states at Policy 4.C.10 that boroughs “should give careful consideration to the relationship between new development and the historic environment including archaeological areas, including tidal foreshores…”. National planning guidance is set out in PPG16: Archaeology and Planning, issued in November 1990.

10.155 The preservation of Westminster's archaeological heritage is a material planning consideration and applicants will need to show that proposed development is compatible with the objectives of the City Council's archaeological policy. The Council will wish to implement that policy under relevant legislation and statutory guidance and by means of legal agreements and planning conditions.

3.6 The relevant section of the LDF for the City is Core Strategy 24:

POLICY CS24 HERITAGE

Recognising Westminster's wider historic environment, its extensive heritage assets will be conserved, including its listed buildings, conservation areas, Westminster's World Heritage Site, its historic parks including five Royal Parks, squares, gardens and other open spaces, their settings, and its archaeological heritage. Historic and other important buildings should be upgraded sensitively, to improve their environmental performance and make them easily accessible.

Reasoned Justification

The intrinsic value of Westminster's high quality and significant historic environment is one of its greatest assets. To compete effectively with other major, world-class cities the built environment must be respected and refurbished sensitively as appropriate. Any change should not detract from the existing qualities of the environment, which makes the city such an attractive and valued location for residents, businesses and visitors.

Detailed policies for each type of heritage asset will be set out in the City Management Plan. Area-based characteristics and detailed measures required to protect and enhance heritage assets have been set out in Conservation Area Audit Supplementary Planning Documents and the Westminster World Heritage Site Management Plan.

3.7 In terms of designated heritage assets defined by the NPPF; World Heritage Sites, Scheduled Ancient Monuments, Historic Battlefields or Historic Wrecks, there on none within the site or within a 250m radius of the site. However, the Adelphi Building is Grade II Listed and the site lies within the Adelphi Conservation Area and the *Lundenwic* and Thorney Island Area of Special Archaeological Priority as defined by The City of Westminster.

3.8 Planning consent has been granted for a programme of refurbishment and alterations to the Adelphi Building (Planning Ref. 13/03399/FUL). Condition 29 of the planning consent relates to the buried historic environment:

No groundworks shall take place for the new lift shaft until the applicant (or their heirs or successors in title) has secured the implementation of a programme of archaeological investigation in accordance with a written scheme of investigation which has been submitted by the applicant and approved in writing by the local planning authority. No development shall take place other than in accordance with the written scheme of investigation.

Reason

To avoid damage to any archaeological remains on site as set out in CS24 of our Core Strategy that we adopted in January 2011 (as amended by the NPPF revision submitted to the Secretary of State on 25 January 2013) and DES11 of our Unitary Development Plan that we adopted in January 2007. (R32AC).

3.9 A written scheme of investigation (WSI) has been prepared according to the condition (Meager 2013b) and has been amended to include further intrusive groundworks not covered by the original planning consent. This report covers archaeological work carried out to the specifications detailed in the WSI.

4 Geology and Topography

4.1 According to the British Geological Survey (Sheet 256; North London) the underlying geology of the site comprises sand silt and clay of the Palaeogene (Eocene) London Clay formation, deposited between *c*. 34 and 55 million years ago. This is overlain by Quaternary Taplow Terrace gravels, whilst towards the south of the site, the gravels are likely to be overlain by more recent Thames alluvium.

4.2 The natural topography in the area of the area is dominated by the steep escarpment which drops from The Strand to the north down to the edge of the Victoria Embankment to the south. The street surface on the Srands to the north of Adam Street lies at *c.* 14.70m OD whilst John Adam Street, to the north of the site is recorded at an elevation of 13.24m OD. This upper level runs through to the Adelphi Terrace at the south of the building. The surface of the basement car-parking area lies at 2.42m AOD.

4.3 The natural topography of the site has however, been significantly distorted by successive phases of development dating from the medieval period onward. The construction and demolition of Durham House, the London seat of the Bishops of Durham, almost certainly involved terracing into the natural slope to the north. More terracing probably took place during the construction of the 18th-century Adelphi complex designed by the Adams brothers and the current 1930s building will probably have involved more terracing into the natural slope to the north.

4.4 However, the modern day ground level to the south of the site is an entirely modern creation which resulted from the building of the Victoria Embankment in the 1860s and the land reclamation and levelling associated with it. This raised ground level to *c.* 5m OD. Excavations undertaken further to the east of the site in and around the City of London have demonstrated that mean tidal levels would have below 2m OD in the late medieval period and all earlier periods would have been associated with a lower tidal level. The known height of the top of the basement slab did not preclude the possibility of archaeological survival below it, particularly in the southern half of the site.

5 Archaeological and Historical Background

5.1 Research into the archaeological and historical background of the site has already been carried out as part of a desk-based assessment of the site (Meager 2013a) and it is not necessary to repeat all of the detail here, though the main points should be highlighted: Additional information, where required, has been added by the authors of this report.

5.2 There is very little evidence for earlier prehistoric (Palaeolithic and Mesolithic) activity in the vicinity of the site, though an Acheulian hand axe is recorded in the area of The Strand, north-east of the site and further Palaeolithic artefacts have been recovered from Pleistocene gravel deposits in the wider Westminster area.

5.3 The Neolithic period is also poorly represented locally though a number of features containing struck flint artefacts and interpreted as broadly prehistoric were excavated at 42 Maiden Lane to the north of the site, whilst investigations nearby at 21-22 Maiden Lane recovered further flintwork and a sherd of possible Bronze Age pottery. Further prehistoric artefacts found in the area include a late prehistoric spearhead from Savoy Place, east of the site and a Bronze Age socketed axe from close to Cleopatra's Needle, to the south.

5.4 The study site lay some distance to the west of the Roman settlement of *Londinium* which was situated to the east of the Fleet River. The latter is no longer visible above ground but its course is closely followed by modern Farringdon Street New Bridge Street. However, both the Strand and Fleet Street follow the line of a Roman road which extended eastward from Ludgate. The area to the north of the site thus formed part of the hinterland of *Londinium* which lay *c.* 2.5 kilometres to the east. There is limited evidence of activity in the vicinity. A Roman tile and two coins were found during the investigations at 21-22 Maiden Lane, whilst a phial of Roman date is said to have been found at Savoy Place.

5.5 Following the collapse of the Roman Empire in the west the walled Roman city fell into ruins and by the mid seventh century the focus of Saxon occupation had shifted westwards to the Strand and Covent Garden (Cowie and Whytehead 1989). A new system of beach markets was adopted where trading was conducted directly from boats pulled up on the foreshore rather than goods being landed at a quay or wharf. Even when these markets relocated eastward in to the old Roman city trading was still initially carried out from the beach itself, rather than from the quayside (Milne and Goodburn 1990). *Lundenwic* developed into a significant trading port and though political control of the town alternated among the Anglo-Saxon kingdoms of the East Saxons, Kent, Wessex and Mercia the port served Mercia almost uninterruptedly from the late 7th or early 8th century until the mid 9th century (Blackmore 2002).

5.6 The settlement around the Strand was almost certainly abandoned by the middle of the ninth century as the pressure of Viking raids increased. Direct attacks upon London were recorded for AD 842, 851 and 872. It is also probable that the trading networks which had helped *Lundenwic* flourish were themselves declining by the middle of the ninth century, partially at least as a result of the disruption to sea borne trade caused by piracy (Hodges and Whitehouse 1983, 163). From the late ninth century onwards Saxon settlement shifted to the old walled Roman city. A small ecclesiastical community had probably existed following the establishment of St Paul's in AD 604 and documentary evidence points to the existence of a Mercian palace within the City. However, neither of these establishments is attested in the archaeological record, The wholesale relocation of the Saxon settlement could have formed part of the planned Alfredian re-occupation and reorganisation of the old Roman city. The first market and harbour to be developed in the City was at Queenhithe, as mentioned in charters of AD 889 and 899. A large paved open area, possibly a market, was already developed at No 1 Poultry by the end of the ninth century and continued in use throughout the late Saxon and early Norman period (Treveil and Burch 1999). Thus within the space of half a century *Lundenwic* had become *Lundenburgh*.

5.7 Within the vicinity of the study site, evidence of Middle Saxon activity has been identified at a number of sites along Bedford Street to the north-west, whilst a Saxon rubbish pit was identified at 366 Strand. To the north of the site, remains of Middle Saxon date were recorded during the investigations at 42 and 21-22 Maiden Lane, with evidence for contemporary occupation being recorded on nearby sites at 26-27 and 28-29 Southampton Street. Further Saxon deposits are recorded from 6-7 Exchange Court and 411-412 Strand. To the west of the site, oak and possible wattling at 12 Buckingham Street has been dated to the 7th century, whilst at 18-20 York Buildings, a very short distance west of the site, further wattling and timbers have also been dated to the late 7th century. Much of the evidence of Saxon activity relates to domestic occupation though human remains of Saxon date are recorded from King Street, some distance to the north of the site.

5.8 The Strand to the north of the study site is documented as early as 1002, with a number of large mansions developing between here and the river from the 12th century. The site was formerly occupied by Durham House, an extensive building that had been established by the 13th century and was the town house for the Bishops of Durham. The main house appears to have directly overlooked the river, whilst the remainder of the property extended northwards to the Strand.

5.9 Archaeological investigations in the vicinity of the study site have revealed surviving elements of a number of the grand medieval residences that lay between the river and the Strand, including a boundary wall belonging to either York House or Durham House at 18-20 York Buildings, walls possibly of the basement of York House at 11

Buckingham Street and remains of terraced gardens at John Adam House, immediately north of the site.

5.10 In the early post-medieval period, Durham House hosted a number of prominent visitors and residents, including King Henry VIII, Cardinal Wolsey, the Boleyn family, Lady Jane Grey, Queen Elizabeth I, Sir Walter Raleigh and ambassadors from France and Spain. The building is also depicted in illustrations of the 16th century (Meager 2013a, figs. 3, 4 & 5). During 1608-9 the New Exchange Building was constructed on the Strand Frontage of Durham House and during the Civil War the house was occupied by Parliamentarian troops, though the building had become somewhat run down and was demolished in 1660. The building was replaced by Durham Yard, visible on a map of 1682 (Meager 2013a, fig. 6), whilst wharf buildings had been constructed on the south of the site by the mid 18th century.

5.11 Durham Yard was extensively redeveloped as the Adelphi during 1769 and 1770 by the Adams brothers. Developments included wharves fronting the Thames with warehouses to the rear and further commercial premises, including underground stables, below the Strand. Four-storey buildings, mostly houses, were constructed with a further two floors below ground level. These developments are visible on maps of the late 18th and early 19th century (Meager 2013a, figs. 10 & 11).

5.12 Between 1864 and 1870 a vast area along the Thames between Westminster and Blackfriars was reclaimed and the Victoria Embankment created under the auspices of Sir Joseph Bazalgette. By 1875 the Victoria Embankment Gardens had been laid out immediately to the south of the study site and clearly the site no longer faced directly onto the river.

5.13 During the late 19th and early 20th centuries there were few further developments on the study site apart from the addition of rear extensions to buildings in the centre of the site but between 1936 and 1938 the site was extensively redeveloped. The structures of the previous Adelphi complex were demolished and replaced with the current Art Deco Adelphi Building, designed by Stanley Hamp. The extent of the new development is indicated on maps produced shortly afterwards (Meager 2013a, figs. 15 & 17) and the building footprint has changed little since that time, though an additional three storeys were added to the top of the Adelphi Building in 1993.

6 Archaeological Methodology

6.1 The fieldwork comprised the archaeological monitoring of the excavation of a number of small test pits along with the archaeological excavation of the lift shaft pit. All aspects of the work followed national (IFA 2008) and local (GLAAS 2009) guidelines. A Written Scheme of Investigation was prepared for the archaeological work (Meager 2013b).

6.2 Test Pits 1-3 were located towards the west of the site within the basement car park, in an area proposed for development as a new service yard (Figs. 2a & 2b). The aim of the test pit excavations was to identify the extent of the pile caps employed in construction of the 1930s Adelphi Building. The concrete basement slab was initially broken out in each of the areas of investigation by specialist contractors and thereafter modern make-up and levelling layers associated with the construction of the Adelphi Building were excavated using hand tools under archaeological supervision until the pile cap base level was reached, when excavation ceased. A written, drawn and photographic record of the excavated levels was maintained as the excavations progressed, with excavation work temporarily halted to allow more detailed recording of remains as appropriate.

6.3 The lift shaft pit was located towards the eastern edge of the basement car park (Fig. 2b), where the base of a new lift system serving all floors of the building was to be positioned. Again the basement slab was removed by specialist contractors using power tools with all subsequent excavation undertaken by hand as outlined above.

6.4 The lift pit contained a large mass of concrete in the northern part of the trench. Archaeological deposits in the southern part were fully excavated to a safe shoring level before the concrete mass was broken out and the trench fully shored. Archaeological excavation then continued to the formation depth of the lift pit. Archaeological deposits continued below this level but these were preserved *in situ*.

6.5 All recording systems adopted during the investigations were fully compatible with those most widely used elsewhere in London; that is those developed out of the Department of Urban Archaeology Site Manual, now published by Museum of London Archaeology (MoLAS 1994). Individual descriptions of all archaeological and geological strata and features excavated and exposed were entered onto pro-forma recording sheets. All plans and sections of archaeological deposits were recorded on polyester based drawing film, the plans being at a scale of 1:20 and the sections at 1:10. The OD heights of all principal strata were calculated and indicated on the appropriate plans and sections. Levels of individual deposits were calculated from the surveyed basement car park surface elevation (+2.42m OD).

6.6 Digital photographs were taken of each test pit as excavation progressed, to provide a record of individual deposits and general progress of the monitoring exercise. An extensive digital photographic record was made of the excavation in the lift pit trench

which, apart from recording the principal features and structures encountered, documented the progress of the excavation from start to finish.

6.7 The progress of the excavation in the lift pit, which constituted by far the bulk of the work undertaken, was regularly monitored by members of GLAAS on behalf of the City of Westminster. Initially the monitoring was undertaken by Mr Sandy Kidd and later by Ms Diane Walls along with specialist scientific advisors. The largely anaerobic nature of the waterfront deposits encountered provided good preservation of items such as animal bone along with organic elements such as timber and leather. An extensive environmental sampling policy was instituted from the outset in the lift pit trench and maintained throughout the excavated sequence. All spoil produced during the excavation was also metal detected before being removed from the trench which allowed any objects recovered to be allocated to the individual deposits from which they had been recovered.

6.8 The complete site archive including site records, photographs and finds will be deposited at the London Archaeological Archive Research Centre, (LAARC) under the site code JAD 14.

7 Archaeological Sequence

7.1 Introduction

7.1.1 The archaeological works undertaken in the lift pit trench, which essentially comprised the full excavation of the stratigraphic sequence to formation level, differed from those undertaken in Test Pits 1-3. The latter consisted of the monitoring of exploratory geotechnical pits and excavation in these small trenches was limited. Test Pits 1-3 were also sited some distance from the lift pit trench and it is therefore impossible to directly link the deposits and features recorded in these separate locations. The dating evidence recovered from Test Pits 1-3 was also sparse. Though an attempt has been made to integrate the two sets of information into a single phased sequence the results may not be entirely accurate. The two sequences are therefore described separately below, beginning with the fuller lift pit excavation.

7.2 Phase 1: Natural deposits (Fig. 12)

7.2.1 The archaeological sequence in the lift pit trench continued below the required formation level for the concrete base of the lift shaft. Overall excavation of the trench ceased at this level (1.80m below the top of the basement slab or 0.62m OD). However, limited excavation was undertaken below this level to allow for the recovery of three complete driven timber piles which had been used in the series of timber waterfront structures encountered higher up in the archaeological sequence (described in detail below). The removal of these piles opened small windows into the earliest deposits which were recorded in section. Two apparently natural deposits, devoid of artefacts or other signs of human intervention, were recorded. The earliest of these consisted of a blue clay layer [162] which was presumed to be London Clay though the extremely limited size of the areas in which it was encountered precluded confirmation of this on site. Detailed analysis of the column samples taken during the excavation confirmed the identification of this deposit was London Clay rather than riverine alluvium. The surface of the blue clay was exposed in the northern limit of the trench at a level of 0.65m OD and recorded at the most southerly visible point at a height of 0.22m OD. The blue clay was sealed in the southern half of the trench by layer [161] which consisted a heavily indurated surface of large rounded pebbles (or small river cobbles) up to *c.* 5cm in size. In part the gravels had been embedded into the surface of the clay and this combination of pebbles bound in a clay matrix proved exceedingly difficult to break through. This deposit probably represents an early foreshore horizon of the Thames. As seen the surface of the cobbles sloped from 0.30m in the north to 0.22m in the south.

7.2.2 The surface of both of the natural deposits described in this paragraph sloped from north to south toward the centre of the Thames channel. However, it is of particular

importance to emphasise that this was not a consistent fall in gradient. The slope was much more pronounced in the northern part of the trench then became a gently fall in the south. It thus appeared that the trench location had fortuitously been placed at the point where the natural escarpment which falls from the Strand met the gently sloping foreshore of the Thames. The trench was therefore on or close to the tidal limits of the river. This directly affected the subsequent development of this waterfront location, the details of which are described below.

7.3 Phase 2: Gravel foreshore accumulation (Fig. 12)

7.3.1 The deposits and single small timber pile described in this paragraph were either only seen as a result of the localised excavation to remove timber piles as described in the previous paragraphs or in case of the grey sand and gravel foreshore deposit [154] partially excavated to the formation level of the lift pit in the northern part of the trench.

7.3.2 The foreshore layer [154] was excavated in the northern part of the trench. It appeared to have formed from a combination of natural riverine deposition and human intervention as the layer contained domestic waste such as animal bone and a small pottery assemblage broadly dated AD 600-750. The bone assemblage included a notable quantity of skulls which possibly represented butchery waste, though overall the assemblage was a mixture of food and processing waste. Metal objects, including a residual Roman coin dated AD 330-335, were also recovered from this deposit. Fragments of Roman tile and Kentish ragstone which probably also derives from a Roman building were recovered from this layer. The presence and elevated frequency of Roman building materials was a notable feature of the entire Middle Saxon sequence and is discussed more extensively elsewhere in this document. It is worthy of note that the earliest foreshore deposits dated to the Saxon period contained Roman material that clearly arrived from elsewhere.

7.3.3 The portion of the layer excavated was largely located to the north of the timber waterfront structure [145]; the surface sloped noticeably from north to south. There is no doubt that this gravelly foreshore horizon represented the ground surface which was adapted by the construction of the wattle waterfront structure [145]. An identical deposit was recorded further to the south as layer [160]. The continuation of the gravelly foreshore was only exposed during the localised excavation to remove piles in the area. The highest levels recorded on the foreshore deposits were 0.85m OD in the north and 0.38m OD in the south.

7.3.4 Part of a small slender rounded wooden pile [158] was exposed in the trench section in the southern part of the trench. The post, which measured *c.* 70mm in diameter and was more than 0.45m long, appeared to have been driven through the gravelly foreshore deposit [160] and probably represents the earliest phase of waterfront

construction uncovered in the lift pit excavation. Clearly it was impossible to prove whether this formed part of a more extensive waterfront structure given the very limited excavation undertaken in this area.

7.4 Phase 3: Waterfront 1. Wattle waterfront and bank, mudflats (Figs. 3 & 12; Plates 1 & 2)

7.4.1 The earliest documented waterfront structure consisted of a wattlework riverside structure which had apparently been built *in situ* on the foreshore (Plates 1 and 2 below). A series of driven posts *c.* 10cm or less in diameter had been driven into the foreshore and the wattle rods twisted around them. This structure was located in the northern part of the trench and extended from east to west beyond the limits of excavation. The highest level recorded on the partially rotted timber uprights was 0.78m OD though the base of the wattlework was recorded at 0.65m OD.

7.4.2 The effect of this waterfront intervention was apparent in the stark contrast between the deposits evident on either side of it. To the north lay a mix of dumped domestic waste mixed with wattlework and brushwood recorded as layer [153] whilst to the south was a deposit of grey silt which resembled a tidal mud-flat recorded as layer [152].

Plate 1: Wattle Waterfront 1 Structure [145].

7.4.3 It was unclear whether the mass of wattlework and brushwood found on the northern side of the structure was all dumped as consolidation of the embankment or it was

composed in part of elements of the original structure [145] which had later failed and slumped over. The second interpretation is a possibility but it might seem more likely that the wattlework would have fallen into the riverside and been washed away, especially as the posts which held the wattlework had clearly been pushed over toward the south by the weight of the material dumped to the north of them. The embankment recorded as layer [153] sloped from 0.95m OD in the north to 0.69m OD in the south.

7.4.4 The pottery recovered from layer [153] has been broadly dated AD 600-850. However, the position of the bank in the stratigraphic sequence demonstrates that it pre-dates a later horizon which contained a coin provisionally dated to the third quarter of the seventh century. Both the embankment and Waterfront 1 might therefore date to or before the middle of the seventh century. A number of cattle skulls and one pig skull may indicate butchery waste within the animal bone assemblage. Roman building material was again present in the form of box flue tile, Kentish rag and oolithic limestone. No dating evidence was recovered from the foreshore horizon [152].

Plate 2: Wattle Waterfront 1 Structure [145]. Scale 0.50m

7.5 Phase 4: Waterfront 2. Demolished post and plank revetment (Figs. 4 & 12; Plate 3)

7.5.1 Waterfront 2, recorded as Structure [167], was composed of a series of 6 postholes measuring *c.* 10-15cm in diameter which extended roughly east-west across the central

part of the trench and one extant post [132] which marked the easternmost extent of the alignment within the trench. The postholes were recorded as [108], [128], [130], [138], [140] and [142]. This new structure replaced the earlier waterfront [145] which had clearly failed as the shoreside embankment layer [153] had later been sealed by a grey silty layer [146] which closely resembled the earlier tidal mudflat deposit [152]. The alignment of the waterfront had also been altered as the new structure followed a more southwest-northeast line than that used in Waterfront 1 (see Plates 2 and 3).

7.5.2 Waterfront 2 was unlike the previous structure as there was so sign of wattle having been used in its construction and the posts were considerably more robust. With the exception of the one extant post [132] it appeared that the 'postholes' had actually been formed when the structure was demolished and the posts broken off. The bases of the posts were still *in situ* but lay below the formation level of the trench and could not be recovered. Post [132] was removed in its entirety, it consisted of a sharpened driven pile which measured up to 0.14m in diameter and 0.69m long though the flat top had probably been sawn off when the structure had been demolished. The highest level recorded on the top of the post was 0.88m OD.

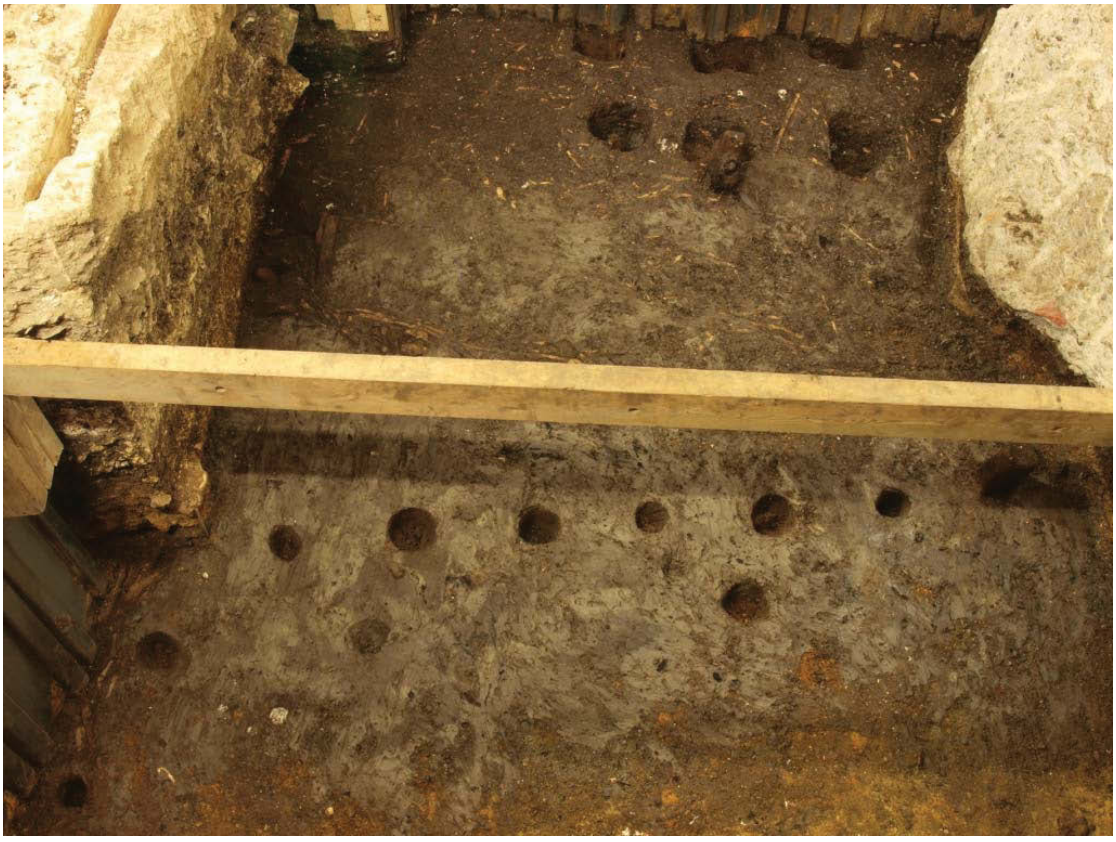


Plate 3: Waterfront 2. Demolished post and plank revetment

7.5.3 It is almost certain that the structure recorded as Waterfront 2 consisted of a post and plank revetment which had subsequently been demolished. The thoroughness of the dismantling of this structure apparently included the levelling of the ground around it as no deposits were recorded which could definitively be identified as levelling on the landward side of the timberwork. Layer [102] sealed some though not all of the postholes which marked the line of the structure but it also extended to the south of them and therefore forms part of a later phase of disuse and subsequent renewal of the waterfront. At present the date of the structure is unknown but its position in the sequence suggests that it was built before or in the middle of the seventh century.

7.6 Phase 5: Waterfront 3. Demolished post and plank revetment. Orange gravel foreshore accumulation (Figs. 5 & 12; Plates 4 & 5)

Plate 4: Waterfronts 3 and 4. Elements of Waterfront 2 are also evident in the foreground. Scale 0.50m

7.6.1 As mentioned above layer [102] might have originally been associated with the construction of Waterfront 2 but it extended to the south of this structure and appeared to be a mixture of riverine deposition consisting of bluish grey silt, gravel and clay and human waste dumped into this matrix. The layer contained metal slag and other metal objects along with animal bone, building stone, Roman tile and building stone and a small pottery assemblage dated AD 600-750. This layer was recorded in the northern

part of the trench below a level of 0.95m OD. As was invariably the case with the deposits found in this part of the trench the surface sloped markedly from north to south.

7.6.2 Waterfront 3 was recorded as Structure [168] which consisted of a line of six posts which extended across the entire width of the trench, though a noticeable gap existed between two of these where at least one extra post should have been evident (see Plates 4 and 5. However, project level had been reached in this part of the trench at virtually the same level at which the timbers that formed the structure were evident and further timbers might have been covered by the stratigraphy in this area. Waterfront 3 lay approximately 1.50m to the south of Waterfront 2. A slight shift in the alignment of the bank was again evident as Waterfront 3 followed a more southwest-northeast course than it's predecessor.

Plate 5: Gravel foreshore [101] and [100]. Note the quantities of building material. Scale 0.50m

7.6.3 Unlike the later Waterfront 4, where the tops of the timber had decayed, it appeared from the flat tops of the timbers that made up Waterfront 3 that this structure had been deliberately demolished and several of the timbers cut down. This might also explain the apparent absence of timbers in some parts of the alignment. It is assumed that the uprights recorded as Structure [168] had once supported horizontal planking that

formed a timber river wall. The highest level recorded on the tops of the timbers was 0.75m OD.

7.6.4 As was the case with Waterfront 2 an attempt was made to recover a complete post, [122], from this alignment. Though the tip broke before it could be extracted the timber was over 0.68m long which was surprising given that it was only 90mm in diameter.

7.6.5 The timbers which formed this waterfront had been sealed and were surrounded by orange sand and gravel deposits which appeared to be a natural foreshore accumulation, though these layers could conceivably have been eroded from the hillside to the north or dumped to create a beach where ships could be more easily accessed. Whatever the method of deposition may have been the orange sand and gravel provided a very distinct horizon in the trench. The surface of these deposits shelved gently to the south in southern part of the trench whilst forming a more noticeable bank in the north. The highest level recorded on layer [100] to the north was 1.14m OD whilst the lowest taken on the surface of layer [101] was 0.57m OD.

7.6.6 A truly remarkable find was recovered from the foreshore horizon formed by layers [100] and [101]. This consisted of a silver coin gilded with gold which has been provisionally dated AD 655-675. Apart from the intrinsic interest of the coin as an object it provides an excellent dating bracket for this part of the archaeological sequence. The condition of the coin is very good and it would not appear to have been in circulation for an extended period. This would suggest quite strongly that the orange foreshore horizon can be dated to the third or fourth quarters of the seventh century.

Plate 6. Coin of the 'Two Emperors' type. Provisionally dated AD 655-675

7.6.7 Layers [100] and [101] also contained a single sherd of pottery dated AD 600-850 along with animal bone, fragments of timber and a considerable quantity of Roman

brick, tile and building stone. The quantities, completeness and types of the Roman building materials evident in this horizon suggested the systematic dismantling and transportation of a major Roman structure to the Saxon waterfront. The most obvious source for this material would be the Roman city of *Londinium*. A nearby source may have been available but as yet no major Roman monuments of this size have been identified in the area.

7.6.8 The orange foreshore horizon was sealed by dump layers [98] and [99] which both contained high quantities of brushwood or collapsed wattlework mixed in with dumped earth and domestic waste. No pottery was recovered from these layers though they did contain notable quantities of Roman building materials and stone. These layers presumably represent levelling layers dumped to form a new land surface to the north of the new waterfront. In the north these deposits were recorded below a level of 1.20m OD, to the south the surface sloped down to 0.70m OD. The dating evidence provided by the coin and pottery suggests that Waterfront 3 was constructed in the late 7th or early 8th centuries.

7.7 Phase 6: Waterfront 4. Demolished post and plank revetment (Figs. 6 & 12; Plate 4)

7.7.1 Waterfront 4 was recorded as structure [169] and consisted of six driven vertical piles which extended across the southeast corner of the trench. This line of posts undoubtedly continued beyond the limits of excavation and followed the same alignment as Waterfront 3 which lay *c.* 0.40m to the north. The posts which formed Waterfront 4 were more robust than those used in Waterfront 3 measuring up to 0.15m in diameter. An attempt was made to recover timber [117] and though the tip broke during excavation this pointed stake measured 0.91m long. Though it can be assumed that this line of posts represents a dismantled post and plank revetment similar to Waterfront 3 no attempt had been made to cut down the posts, the tops of which appeared to have decayed *in situ*. The highest level recorded on the extant timberwork was 1.17m OD.

7.7.2 Layer [97] was recorded to the north of the line of posts and represented land levelling and raising on the landward side of the waterfront. This very mixed layer was composed of dumped domestic waste in a matrix of sand, gravel, clay and silt that all resembled riverine deposits. The dumped waste included wood ash, areas of oyster shell midden, a very substantial assemblage of animal bone, fragments of timber, leather and quantities of Roman brick, tile and building stone.

7.7.3 The surface of this layer was quite flat to the north but distinctive tip lines within it and on its surface, mainly composed of wood ash, showed a marked slope to the south close to the line of posts that constituted Waterfront 4. These indicated that the very

mixed deposits recorded as layer [97] had undoubtedly been transported from the landward side and used to level and raise the ground to the north of the waterfront.

7.7.4 Layers [75] and [76] were excavated in the north of the trench and also appeared to form part of the dumping sequence associated with the establishment of Waterfront 4 though they could not be directly related to it stratigraphically as they had been truncated by the concrete mass which occupied this part of the excavation area. Layer [76] comprised a midden of oyster shells whilst [75] was another mixed dump containing elements of wattlework and brushwood. The highest levels recorded on the dump deposits in the north was 1.22m OD whilst layer [97] further south was excavated below 1.14m OD.

7.7.5 A wide variety of domestic and craft objects was recovered from these dump layers. These included two hone stones, a fragment of antler working waste, a lead net sinker and pottery dating to AD 700-850. Direct evidence of trade was provided by some of the finds. The pottery assemblage included pitcher sherds imported from Northern France and a fragment of a German lava rotary quernstone was also notable. The most notable evidence of trade was perhaps provided by part of a barrel made from a coniferous softwood which is not native to Britain. This object is thought to be part of a cask which might have been used for the importation of wine (see Appendix 6). The bulk of the dating evidence demonstrated that Waterfront 4 probably dates to the early 8th century.

7.8 Phase 7: Waterfront advancement and land raising/levelling (Figs. 7 & 12)

7.8.1 The deposits and structures which have been described in the discussion of Phases 2-6 all relate to the early development of the waterfront in the Middle Saxon period and can be dated with some confidence to the 7th and early 8th centuries. As discussed above it appeared that all of the timber structures had essentially been built at a point where the steep escarpment that rises toward the Strand met the tidal foreshore of the Thames. As such they can be viewed as management of the natural river bank rather than large-scale projects designed to advance the waterfront and win new ground from the river. The mere fact that four successive timber structures were located within 3m of each other demonstrates that little or no attempt was made to substantially alter the river regime in this area. The developments in Phase 7 mark a new departure in the development of the Saxon waterfront. Though much of this occurred beyond the limits of the trench there is little doubt that a new timber waterfront was built to the south, beyond the limits of the lift pit trench, and ground level raised substantially. The effect of this reclamation project was to create a new raised ground surface which was apparently above the tidal range of the river. The new ground level would have been at *c.* 1.60m-1.65m OD.

7.8.2 A series of levelling layers, contexts [35], [39], [95] and [96], were grouped into this phase. These layers were confined to the southern half of the trench as they had been truncated by the modern concrete foundations found to the north. These layers were composed principally of domestic waste a large proportion of which was related to food supply; this survived in the form of animal bone and oyster shell. Roman brick, tile and building stone was also a common feature of these dumps. The latest dump, layer [35], was a midden that consisted almost exclusively of oyster shells. Although truncated by later intrusive features this layer occupied the entire southern half of the trench from east to west and extended beyond it. The quantities found might beg the question of whether the oysters were all being consumed fresh or perhaps processed and their shells discarded. Animal bone was abundant throughout these deposits but domestic waste was also evident as lenses of wood ash and fragments of wood. All of the highly mixed deposits that composed these layers appeared to slope to the south as might be expected if cart loads of waste were being bought down the hill that leads north up to the Strand and used to infill an area behind a waterfront located to the south.

7.8.3 The pottery recovered from these layers in some cases had quite wide date ranges but when combined with other elements of the stratigraphic sequence a clear chronological progression can be established. The latest deposit layer [35] contained pottery dated AD 600-750, layer [39] contained pottery dated AD 600-850, layer [95] produced an assemblage dated AD 700-750 and the pottery from layer [96] dated AD 650-850. The latest waterfront structure, which was buried by the land levelling project associated with the waterfront advancement, can be placed in the late 7th or early 8th centuries. None of the pottery assemblages recovered from this phase contained any of the later wares dated to after AD 730/750 or AD 770. The evidence would therefore appear to demonstrate a date in the first half of the eight century for the advancement of the waterfront and land-raising project.

7.8.4 Evidence of craft production began to be more abundant in this phase. Textile working was attested by the recovery of a bone pin beater, (also known as a thread picker) an instrument used in cloth weaving. A fragment of a ceramic loom weight, also associated with textile production, was also retrieved from this phase. This loom weight was the earliest example recovered from the sequence. A small assemblage of antler working waste was also evident some of which might be associated with comb making.

7.9 Phase 8: Domestic structures (Figs. 8 & 12; Plate 7)

7.9.1 The fragmentary remains of a timber building were extant in a very narrow east-west aligned strip of ground which measured at most 0.60m wide (Plate 7 below). This area had survived to the north of the later ditch [15] and to the south of the concrete intrusions which occupied the northern part of the trench at this time. The building had apparently burnt down '*in situ*'; the wall lines consisted of two narrow burnt timber

beams set at a right-angle to each other which measured *c.* 10cm wide and up to 70mm thick. These presumably represented sills which supported uprights. There was a very notable difference between the deposits found to the west of the angle formed by the beams and those evident to the east. An external surface formed of coarse sand and yellow gravel [33] extended to the west whilst a burnt clay layer [26], presumably a remnant of an internal floor, lay to the east. The external surface contained pottery dated AD 600-750. Thin layers of wood ash and decayed or burnt timber sealed the extant structural elements. These in turn were covered by a levelling layer [19] which contained a pottery assemblage dated AD 670-850, this included a few sherds of imported Badorf ware. Given the dates of the pottery recovered from the make-up/levelling layers below the construction horizon and that found in the cut features which truncated the building its construction can be provisionally dated to the early to mid 8th century. The floor of this building and the associated external surface were recorded at *c.* 1.70m OD.

Plate 7. Middle Saxon building. Scorched clay floor evident to right of burnt beam, layers of ash cover orange sand and gravel surface to the left. Scale 0.50m

7.9.2 Although the building documented was very fragmentary it is of considerable importance in understanding the development of this area of the waterfront. The establishment of structures on the waterfront clearly implies that a river wall of some

substance had been built further to the south and that this area was considered to be protected from flooding. The purpose of the building is unknown but it is perhaps significant that the objects recovered from the levels immediately above and below this structure, particular loom weights, show an increasing frequency of materials associated with craft industries. The established view holds that these crafts were probably conducted in buildings also used as dwellings rather than in separate workshops.

7.10 **Phase 9: Disuse of building, cut features (Figs. 9 & 12)**

7.10.1 The building described above may have only been in use for a very short time and was probably abandoned without being replaced after it burnt down. Following this the ground level was raised very slightly to *c.* 1.75m OD by the periodic deposition of layers which sealed the structure but this phase is dominated by the excavation of cut features, pits and a substantial ditch. The layers recorded may represent little more than the levelling of spoil that resulted from the excavation and backfilling of these cut features.

7.10.2 A substantial sub-circular pit was recorded in the southeast corner of the trench as cuts [13] and [90] (two periods of excavation were required due to the insertion of shoring before the pit could be fully excavated. Separate numbers were allocated to ensure the validity of the finds assemblages). Although perhaps only one quarter of this feature lay within the area excavated it measured 1.45m north-south and was 0.86m deep, the highest level recorded on the cut was 1.66m OD.

7.10.3 Two pottery assemblages were recovered from this pit, one dated AD 730-850 the other AD 770-850. Three fragments of loom weights, one almost half complete, were also found as was a fragment of bone working waste possibly associated with comb manufacture. A silver coin identified as Secondary Series K sceat Type 32a or b dated *c*. AD 710-760 was also recovered from fill [89] of the pit.

7.10.4 Although the sequence was not particularly clear it appeared that the pit had truncated a substantial east-west aligned ditch [15] which extended throughout the southern part of the trench and continued to both east and west beyond the limits of excavation, the southern side of the ditch also lay outside of the trench but as seen it measured more than 1.45m wide and was 0.99m deep. The highest level recorded on the cut was 1.76m OD.

7.10.5 Three of the ditch fills produced pottery assemblages one of which has been dated AD 730-850 whilst two were slightly later at AD 770-850. One notable find was a small roll of lead that would have served as fishing weight or net sinker.

7.10.6 After the ditch had been infilled the surface was covered by the extensive layer [11]. This quite loose sandy layer, though not particularly substantial, formed a distinct horizon below the later hard, possibly rammed, surfaces found in this area. Layer [11] contained pottery dated AD 730-750/850. This layer also contained considerable quantities of Roman ceramic building materials, including a box flue tile, and building stone. Building materials that derived from *Londinium* or its environs continued to be frequent throughout the deposits found in this phase. Other stone fragments included pieces of German lava quernstone and another formed from Millstone Grit.

7.10.7 Overall it might be said that the finds assemblage recovered from this phase was distinctly more domestic in nature than that which characterised earlier periods. Taken together the pottery assemblage formed a large percentage of the total recovered and included a notable array of imported wares. This relative abundance was also mirrored in the small finds the vast majority of which came from Phase 9; a wider range of activities was also represented. Antler working waste was again evident some of which is clearly associated with comb manufacturing. Bone-working waste from cattle long bones was also found. The sawn cattle bone also relate to comb-making, with the long bone sections representing a first stage in producing individual tooth plates. A particularly interesting find is a small spindle whorl that may be made from walrus ivory. This item is heavily polished from use, but the very small size may also suggest it was a child's object (see Appendix 9 for detailed discussion of the small finds). It was clear from the evidence of the pits and ditches that this area had become open ground but the frequency of domestic waste might suggest nearby habitation with the area of the trench being used for rubbish disposal.

7.11 Phase 10: Street/yard surfaces (Figs. 10 & 12)

7.11.1 The latest phase of Saxon activity recorded in the lift pit trench consisted of heavily compacted surfaces that might have served as yards or possibly a street. The highest of these was layer [7] which extended over the entire area of excavation south of the modern foundations described above. This layer contained a high proportion of sand, fine gravel and small fragments of both building stone and Roman ceramic building materials. This layer may have been associated with the brick floor which had been laid above it but no finds dating to later than the Middle Saxon period were recovered from this deposit or indeed any of those that lay below it. No limits to the layer were found and it is therefore impossible to determine its original function. Layer [7] contained pottery dated AD 770-850.

7.11.2 Below layer [7] was layer [10] which was also heavily compacted and possibly represented an earlier surface. This layer had been truncated by a sub-circular pit [9] which contained a near complete doughnut shaped loom weight. The pottery recovered from layer [10] has been dated AD 730-750. It thus appeared that this final Saxon

phase (though it was truncated from above by the construction of the later post-medieval floor and therefore may not represent the final phase of occupation) dates to the fourth quarter of the eight century or possibly the beginning the ninth century. The highest level recorded on the latest surface layer [7] was 1.98m OD.

7.12 Phase 11: Medieval/Post-Medieval Features (Figs. 11 & 12)

7.12.1 The latest archaeological feature recorded in the lift pit sequence was a post-medieval red brick floor [44] which was evident only in section and survived to a height of 2.10m OD. The floor, along with the chalk and flint foundation found further to the west, may well have been part of Durham House, the London residence of the Bishops of Durham, or one of the later rebuilds of this complex. The brick fabric has been dated to after 1664 but the mortar employed suggested a date after 1750.

7.12.2 A cluster of six large rectangular postholes, arranged in two rows of three, was recorded close to the northern perimeter of the trench. The postholes were the remnants of driven posts which measured up to 0.30m in diameter. They had been driven through all of the surviving stratigraphy from a ground level that had been truncated when the basement was constructed. The date of these timber piles, which might have supported a heavy masonry structure, is unknown but they might have formed part of the medieval or post-medieval bishop's palace which stood on the site. Alternatively they could also have been associated with the construction of the Adams brothers Adelphi complex or even the standing Adelphi Building. These posts were first evidenced as voids within the concrete mass that occupied the northern part of the trench and they must have been extant in a decayed state when this concrete was poured around them.

7.13 Phase 12: Modern features and deposits

7.13.1 A layer of brown clay [44] was recorded in the extreme north of the trench below the modern concrete slab. This deposit, which sealed three of the large post-medieval postholes described in the previous paragraph, was a levelling deposit almost immediately below the modern concrete slab. A very small pit [78] was also recorded cutting in to the top of the archaeological sequence in this area.

7.14 Test Pits 1-3 (Fig. 11)

7.14.1 Although closely grouped in a small area of the site, the deposits exposed in the three test pits varied considerably, specifically the remains recorded in TP1 compared with those in TP2 and TP3. TP1 contained an extensive masonry wall foundation [3] constructed from roughly hewn flint, chalk and stone blocks up to 300mm across, randomly coursed within a hard, very light yellowish brown lime mortar. The foundation extended beyond the limits of excavation in all directions. The area exposed measured

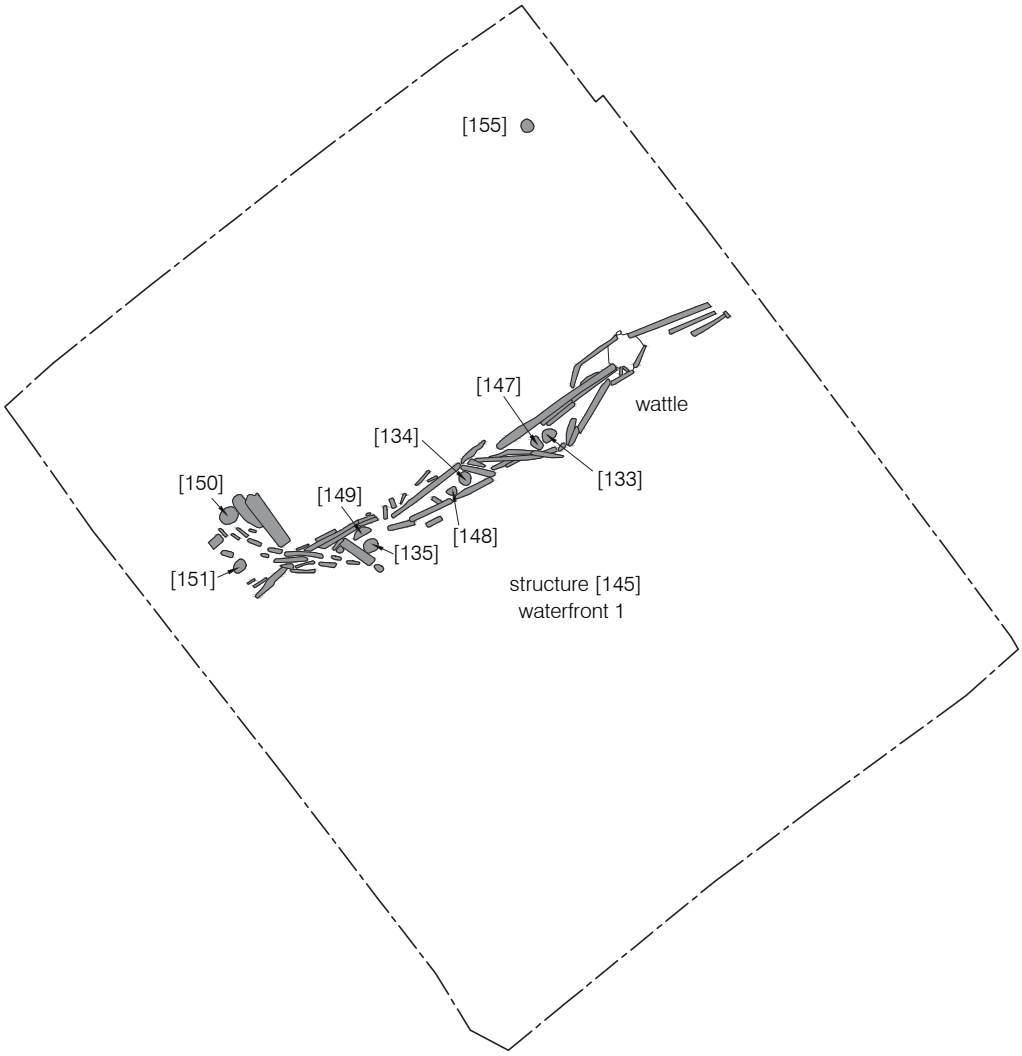
in excess of 1.5m east-west by more than 1.2m north-south, with trial excavation revealing it was at least 1m thick. The surviving top of the foundation was recorded at an elevation of 2.20m OD. As the foundation extended beyond the limits of the trench it was unclear exactly how extensive the remaining masonry was, or how it was aligned. Given the materials employed and the scale of the masonry it is likely that it was the remnant of the foundations of the medieval Durham House or one of its successors. However, no datable materials were recovered from the foundation and the date of the deposits into which it was excavated is obviously unknown as these were not seen let alone excavated. This foundation does, however, clearly fall in to Phase 11.

7.14.2 The masonry was overlain by an intermittent layer of stiff, mid brown clay [2] which contained a London stock brick dated with the mortar to after 1890. This layer was apparently laid as a levelling deposit prior to the pouring of the concrete for the basement slab [1]. Both the levelling layer and slab form part of Phase 12.

7.14.3 The only deposit recorded in TP2 was a loose, very dark greyish brown, sandy silt [4] that appeared to have a high organic content and contained large numbers of oyster shells along with quantities of animal bone. Small amounts of Roman brick were also recovered. The deposit was only exposed in an area measuring 1m east-west by 0.30m north to south, though it was at least 1m thick, excavation having ceased when the base of the pile cap was reached. The lowest elevation reached in this test pit was 1.22m OD, whilst the surface of deposit [4] was recorded at 2.20m OD.

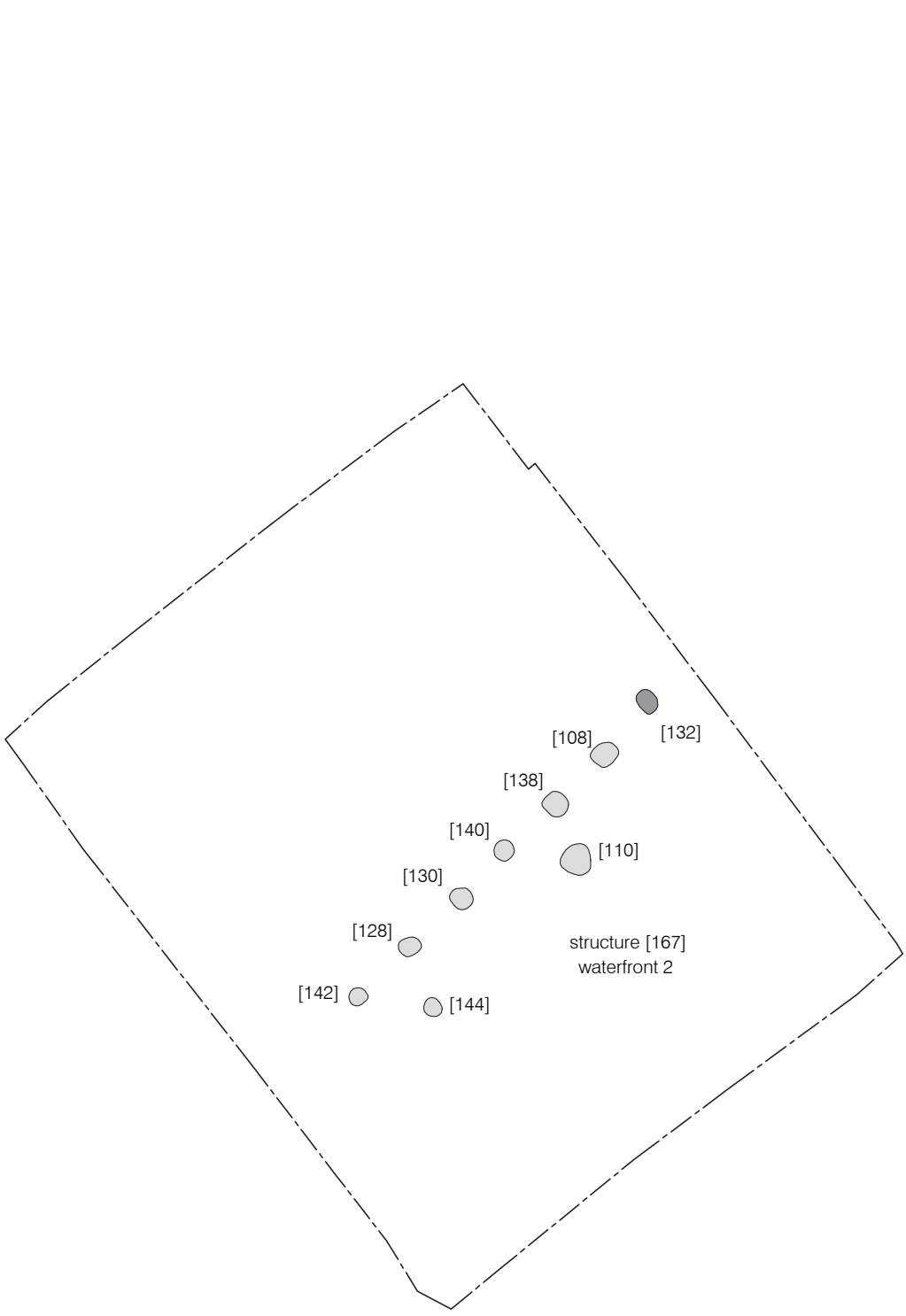
7.14.4 Though the excavation of this deposit was not monitored by the same members of staff that conducted the lift pit excavation its composition and the range of finds included suggest that it was of Middle Saxon date. No later finds were recovered from this layer or fill and though no Saxon objects were evident pottery was generally scarce and the Saxon sequence recorded in the lift pit trench contained Roman building materials from top to bottom. Given that this deposits formed the upper part of the sequence in this Test Pit it might be equated with Phase 10. The possible midden material was directly overlain by the basement slab [1].

7.14.5 TP3 also contained a very dark greyish brown, sandy silt layer [5] which was very similar to that recorded in TP2 and probably a north-eastern extension of the same deposit. This was also only exposed in a very small area. However, it was clear that quantities of oyster shell and animal bone were present and Roman brick and tile fragments were also recovered. This deposit can also be equated with Phase 10. Again, the layer of fill was directly overlain by the basement concrete slab [1].



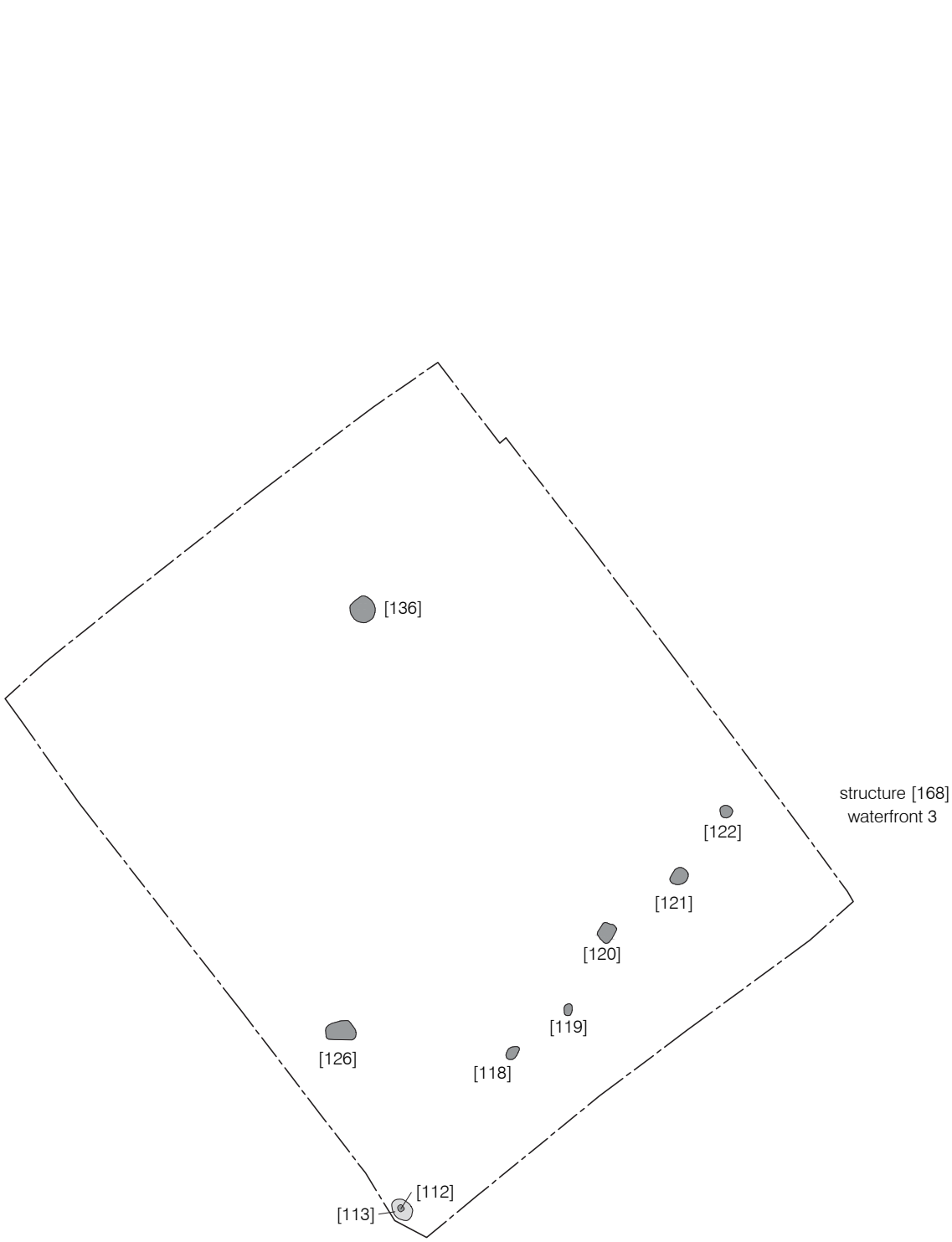
19/05/15 JS

Figure 3
Phase 3: Middle Saxon
Waterfront 1
1:40 at A4



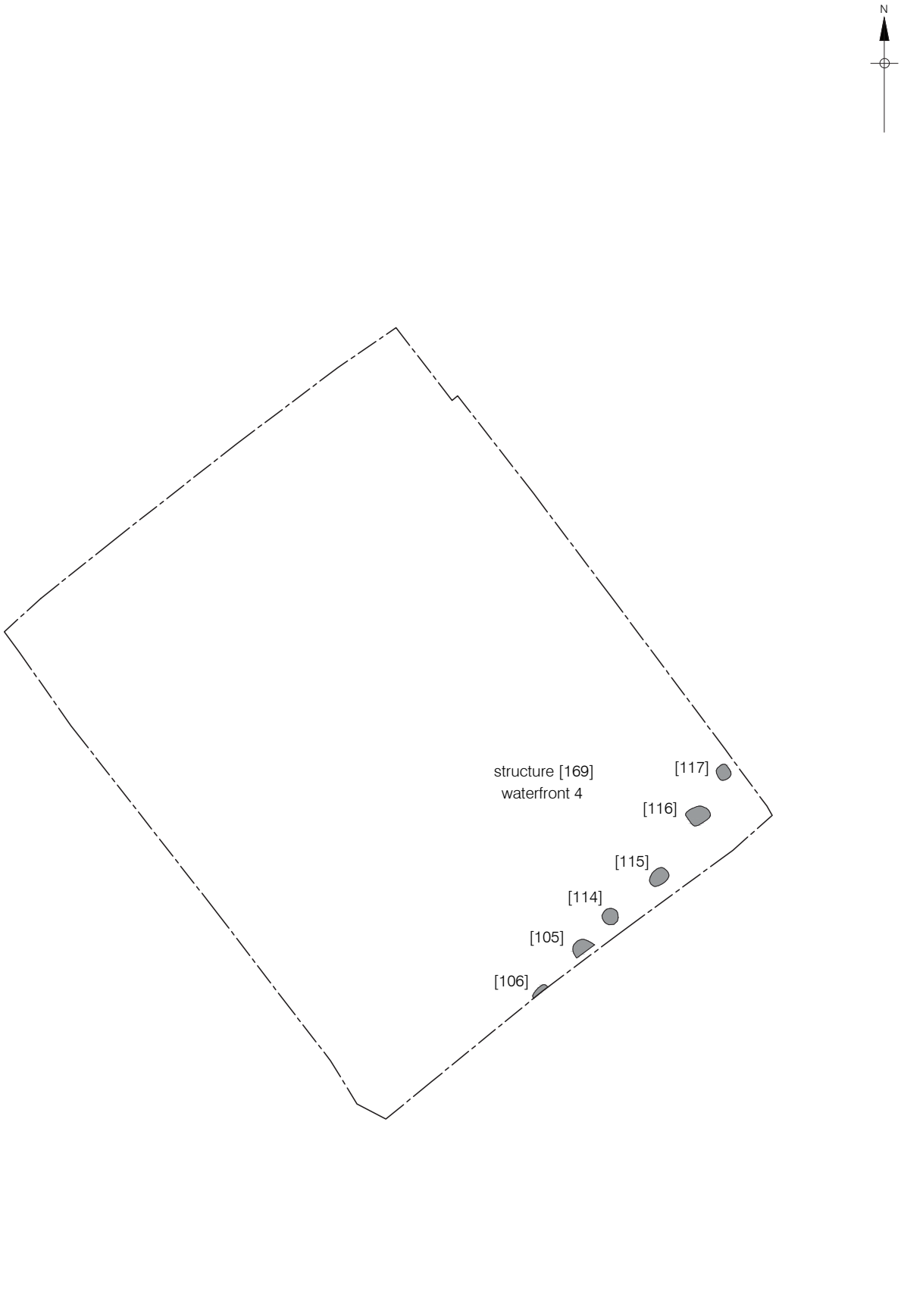
19/05/15 JS

Figure 4
Phase 4: Middle Saxon
Waterfront 2
1:40 at A4



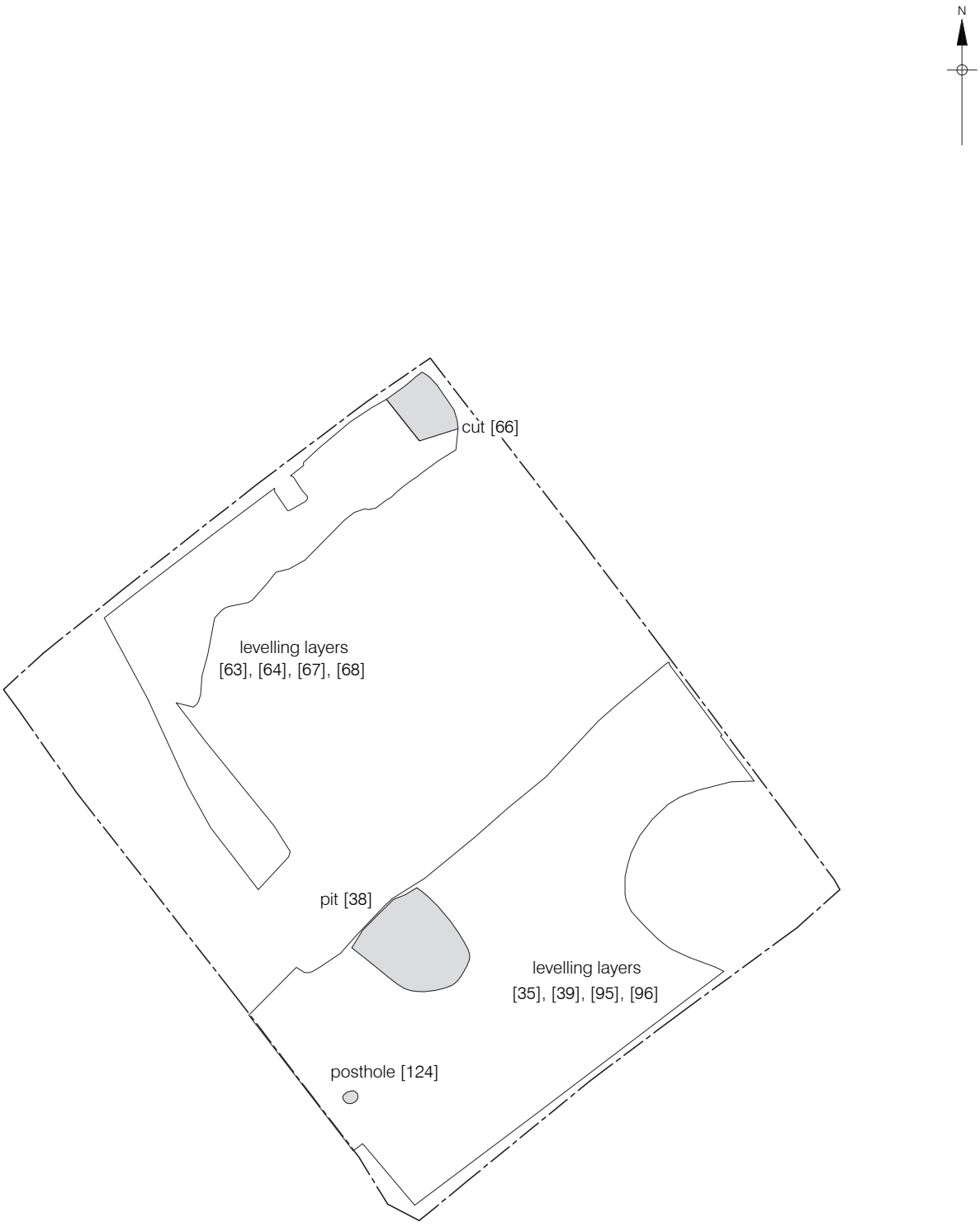
19/05/15 JS

Figure 5
Phase 5: Middle Saxon
Waterfront 3
1:40 at A4



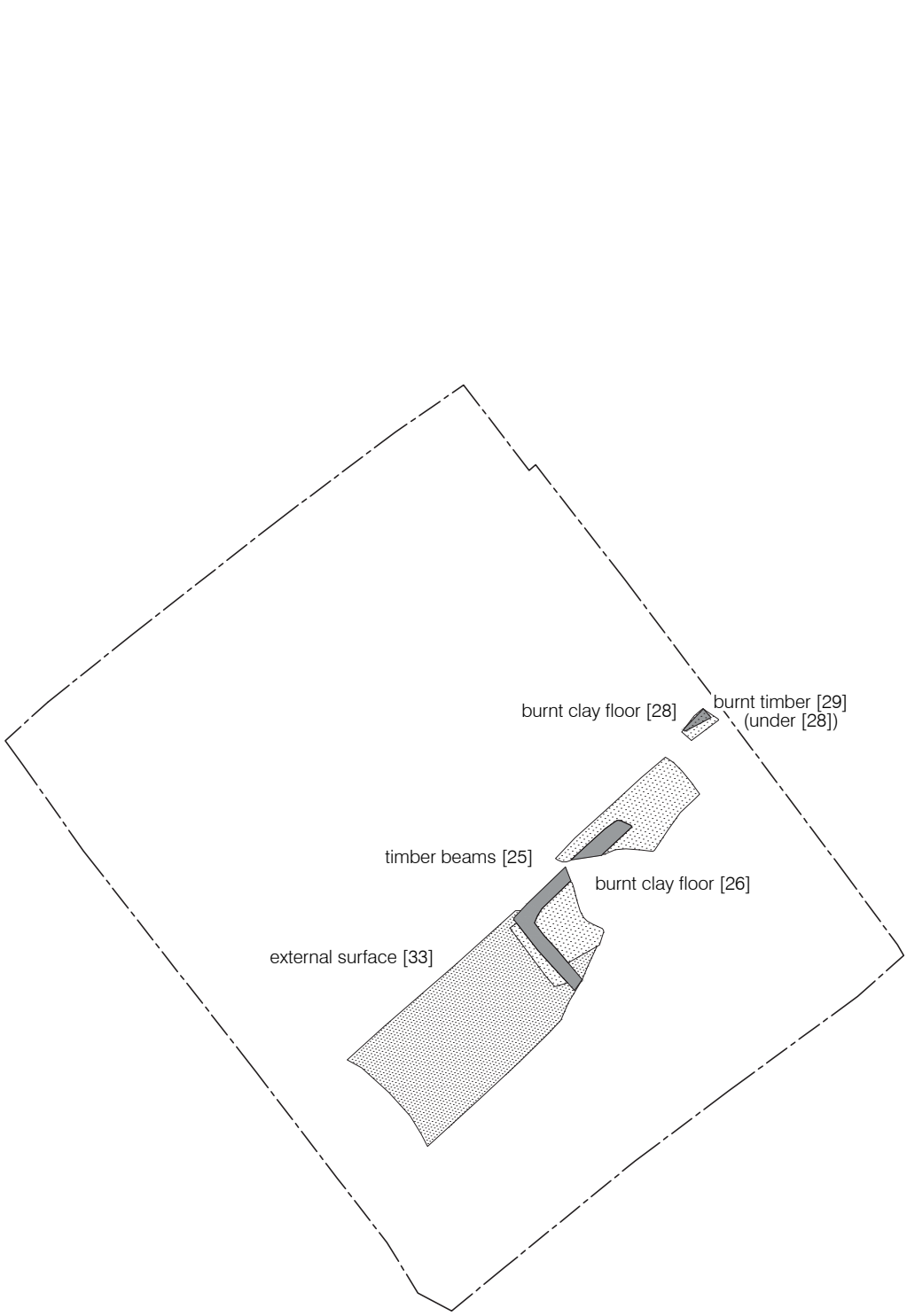
19/05/15 JS

Figure 6
Phase 6: Middle Saxon
Waterfront 4
1:40 at A4



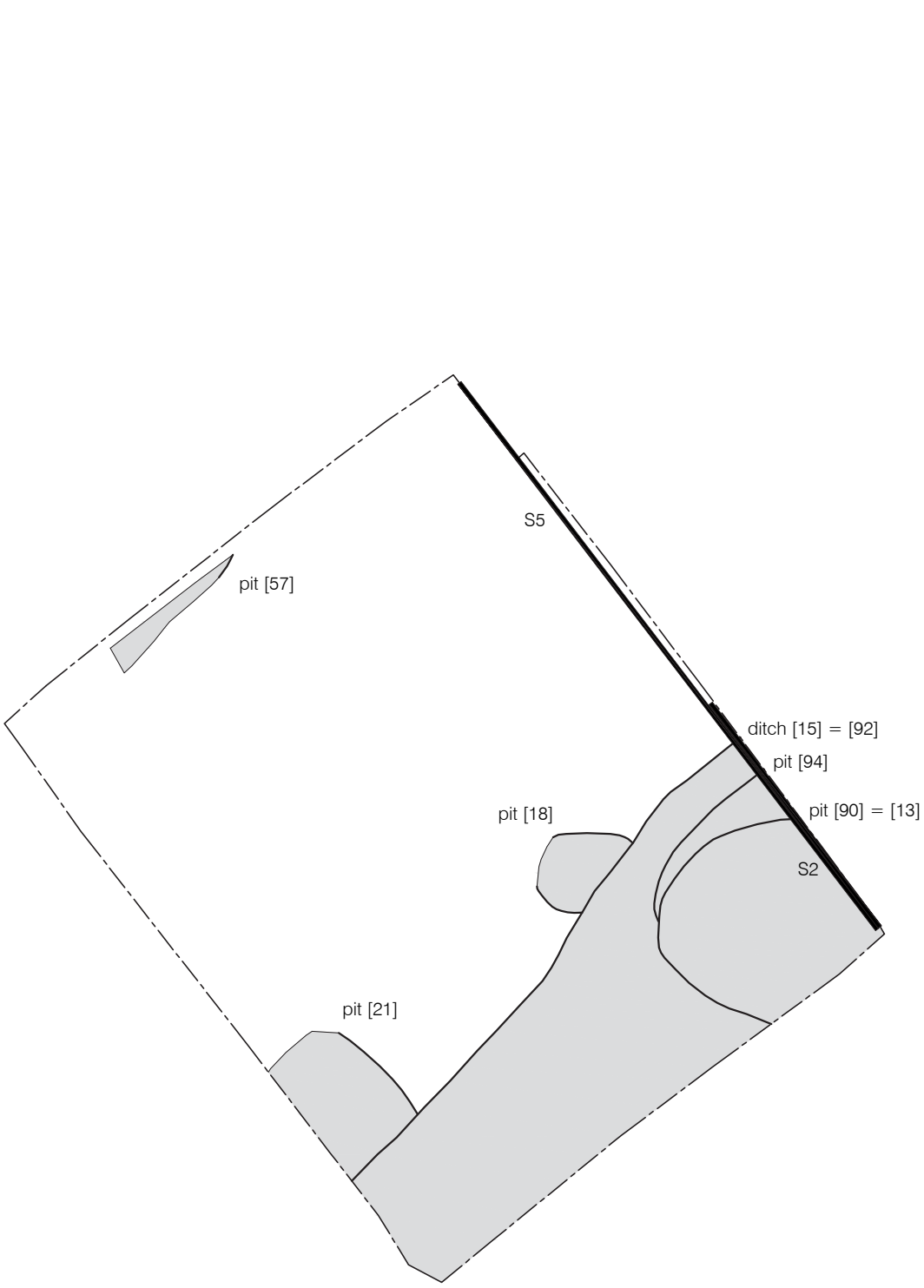
19/05/15 JS

Figure 7
Phase 7: Middle Saxon
Levelling and Waterfront Advancement
1:40 at A4



19/05/15 JS

Figure 8
Phase 8: Middle Saxon
Building
1:40 at A4



19/05/15 JS

Figure 9
Phase 9: Middle Saxon
Cut Features
1:40 at A4

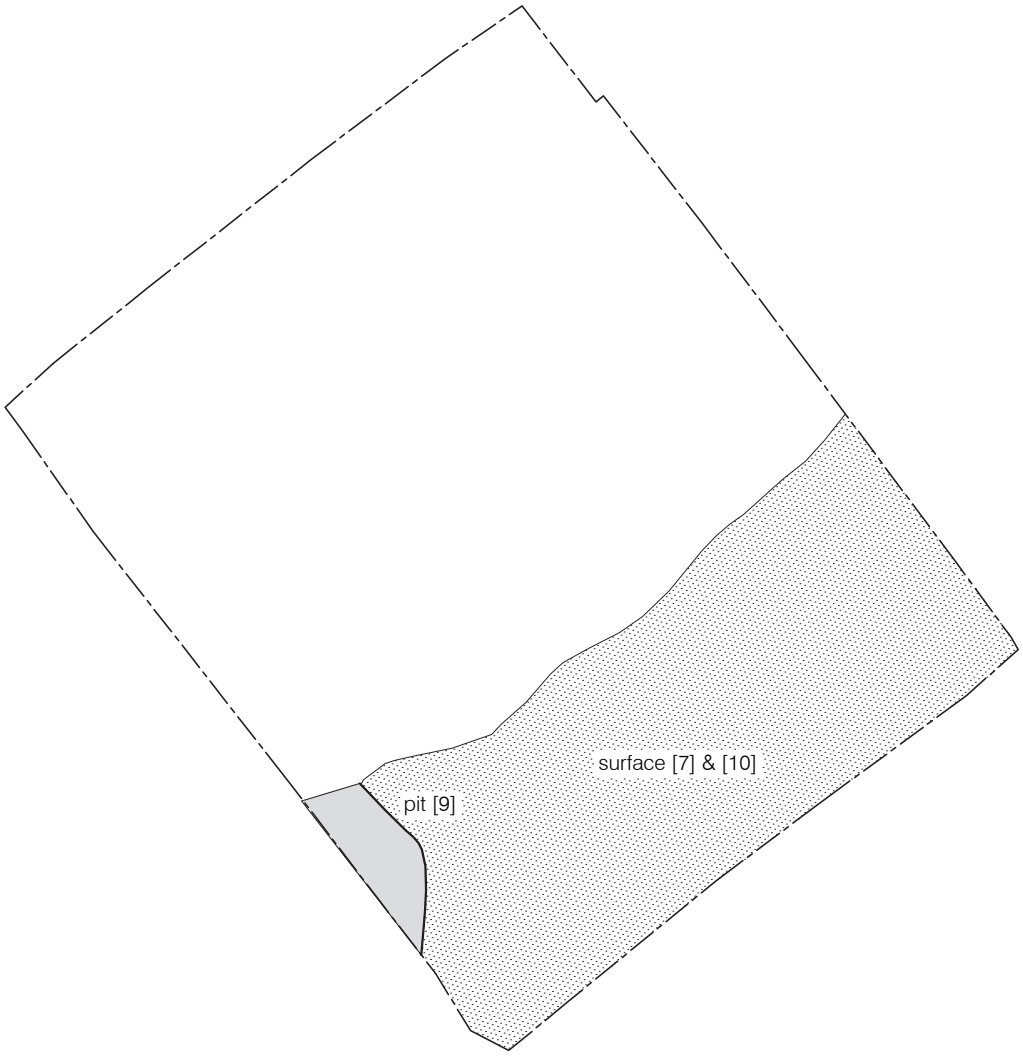


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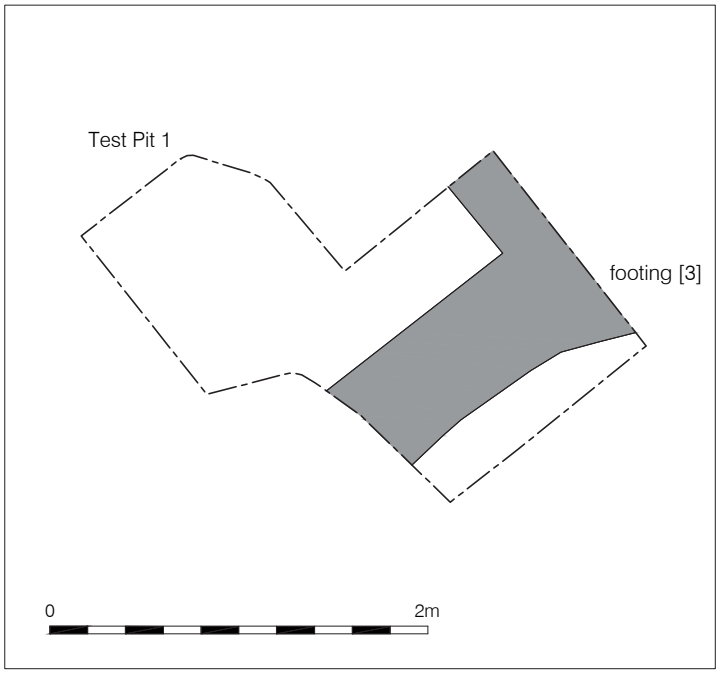
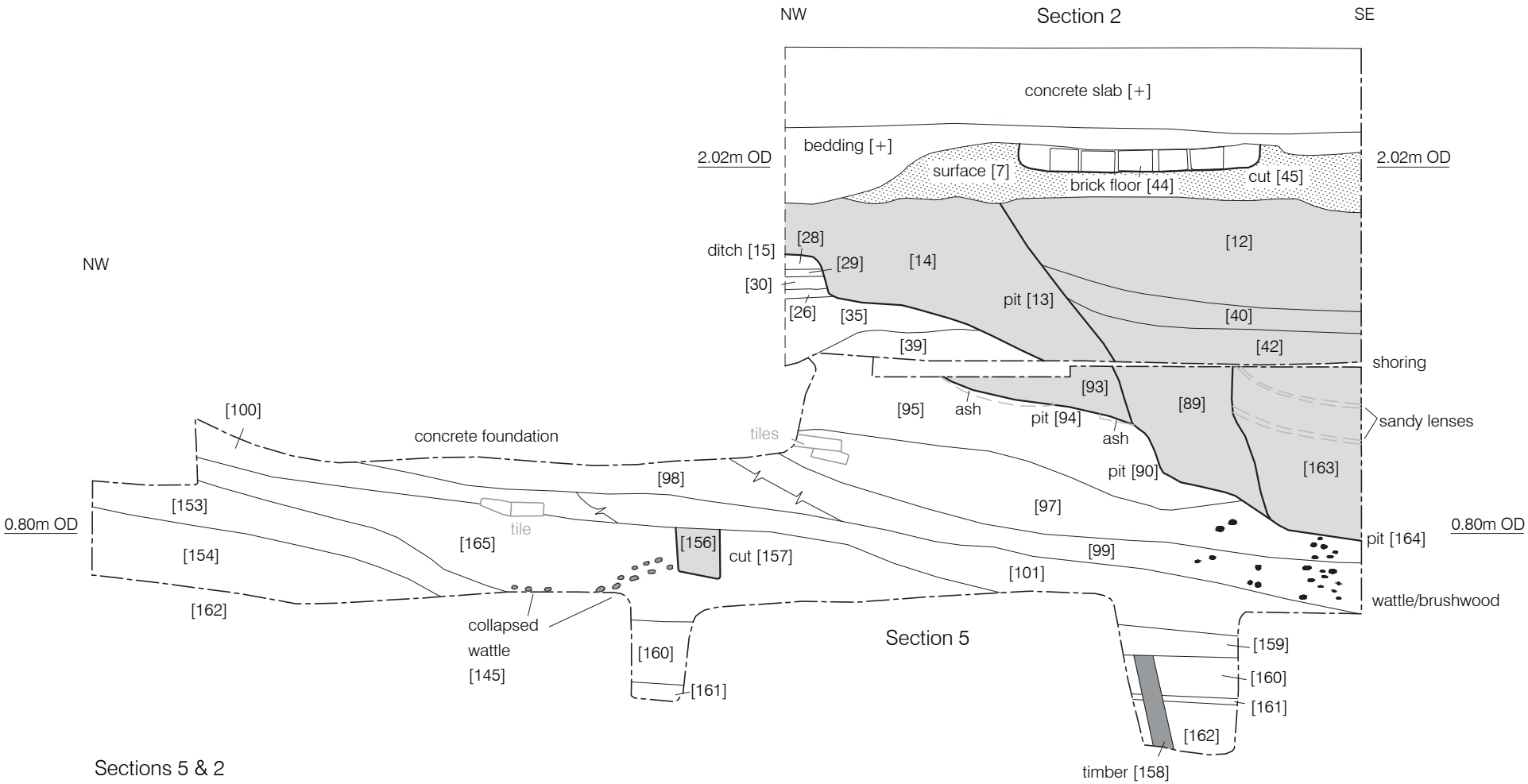
Figure 10
Phase 10: Middle Saxon
Surfaces
1:40 at A4



19/05/15 JS

Figure 11
Phase 11: Post-Medieval
Postholes & Footing
1:40 at A4



Sections 5 & 2
Lift Pit
Southwest Facing

0 1m

19/05/15 JS

Figure 12
Section 5 & 2
1:20 at A4

8 Phase Discussion

8.1 The earliest deposits recorded in the Lift Pit shaft consisted of a blue clay layer. This layer was only exposed in a few very limited areas but lithostratigraphic analysis of the environmental column samples taken on site has confirmed that this material was London Clay. The blue clay was sealed in the southern half of the trench by an indurated surface of large rounded pebbles. The latter probably represents an early foreshore horizon of the Thames. As seen the surface of these small flint cobbles sloped from 0.30m OD in the north to 0.22m in the south. The surface of the blue clay was exposed in the northern limit of the trench at a level of 0.65m OD and recorded at the most southerly visible point at a height of 0.22m OD. The levels are comparable to those recorded to the west of the site at York Buildings and Buckingham Street. At York Buildings, where a stretch of the Middle Saxon waterfront was traced over a distance of *c.* 17m, the lowest level of the embankment was recorded at 0.60m OD (Cowie 1992, 164-168) whilst at Buckingham Street silty organic clay was recorded in pile holes at +0.35m OD and –0.10m OD. The lower levels seen at Buckingham Street may be a reflection of the local topography as the Cock and Pye Ditch, a stream which lay close to the western limit of *Lundenwic*, probably joined the Thames in this area (Cowie and Blackmore 2012, 27-28).

8.2 Phase 2 largely consisted of a gravelly foreshore deposit recorded as layers [154] and [160] which contained the earliest dating evidence. The London Clay and small river cobbles which were embedded in its surface were sealed by this foreshore deposit. The pottery assemblage recovered from layer [154] has been dated AD 600-750 and a silver coin dated *c*. AD 710-760 which is most likely intrusive was also recovered. Fragments of Roman tile and Kentish ragstone, which probably also derives from a Roman building, were recovered from this layer. There is no doubt that this gravelly foreshore horizon represented the ground surface which was adapted by the construction of the wattle waterfront structure [145], (Waterfront 1). The foreshore surface sloped noticeably from north to south. The highest levels recorded on this foreshore deposit were 0.85m OD in the north and 0.38m OD in the south.

8.3 Phases 3-6 consisted of the four lines of waterfront structures and the material dumped behind them to form embankments. In some areas the dumped material was mixed with riverine deposits indicating either periodic failure of the waterfront or tidal inundation whilst construction work was being carried out. The details regarding the construction of these successive waterfronts have already been described in Section 7 of this report and a more general view is presented here. The waterfronts appear to be short-lived and if it is assumed correctly that they represent the embanked edge of the river it seems that little or no attempt was made to win new ground or advance the waterfront in its earliest stages. No firm evidence was recovered which showed that

square or rectangular sections of the waterfront had been defined by driven stakes and planking and systematically infilled with brushwood, domestic waste and building rubble, which has been suggested as the construction method used nearby at York Buildings (Cowie 1992, 117). However, this may in part simply be a function of the size of the trench excavated at the Adelphi Building as any putative elements which might have been aligned perpendicular to the waterfront could easily have lain outside of the limits of the trench. In other respects the methods of construction and the levels at which the structures and embankment were found seem to have been remarkably similar to those seen at York Buildings, with the exception of the earliest Waterfront 1 which was made from wattlework rather than posts and planks. The material which made up the embankments at the Adelphi Building was very mixed consisting variously of dumped domestic waste (particularly animal bone), riverine deposits which had resulted from flooding or excavation of the foreshore and large quantities of brushwood. Analysis of the column samples taken on site has identifies peat beds as the source of some of the highly organic material recorded in these deposits; building material, in the form of Roman brick, tile and ragstone, were also abundant. Almost all, if not all, of the building material derived from decayed or demolished Roman structures. In all over 250kg of building material were recovered from the excavation of the Lift Pit.

8.4 The quantity of the Roman building material present is in itself intriguing. The ceramic and stone elements present represent a wide range of structures and though some such as the moulded stone derived from funerary monuments might have been accessed along the line of the Roman roads outside of the old city it appears unlikely that all of the material present could have been found in the locality of *Lundenwic*. This strongly suggests that it was imported from the ruins of *Londinium*. Bulk transport of this material could most economically have been effected along the river. Though it has been pointed out that the building of a bridge over the Fleet River was not a feat beyond the capacity of Middle Saxon engineers no such structure has been identified. Even if a bridge had existed it seems unlikely that this material would have been transported by land simply to have been used as landfill along the waterfront. Though brick and tile were not made in this period their qualities were appreciated by the inhabitants of the Saxon town and re-used Roman materials are often found in hearths and ovens. The quantities of building material suggest that the Roman city was being systematically ‘mined’ whilst the Saxon town was being built. This would have required a considerable degree of organisation as it is unlikely that this arduous and time-consuming enterprise would have been undertaken without some guarantee of an end market. The mass importation of Roman materials might be one aspect of the centralised planning evident in the layout and rapid development of the Middle Saxon town (Cowie and Blackmore 2012, 108).

8.5 Precise dating of the waterfront structures found at the Adelphi Building would represent a notable contribution to our understanding of the development of the Middle Saxon waterfront. Unfortunately no dates could be established for the timber samples submitted for dendrochronological analysis. The samples did contain enough rings to make measurement and analysis valid but growth sequences recorded could not be matched to the tree-ring series known from Britain or Continental Europe. (Tyers, Appendix 7). The slow growing and distorted oaks used in the construction of the waterfront appear to be atypical and a product of localised conditions which affected their growth. All of the samples submitted came from posts which had formed parts of the waterfront structures. No planks were recovered as these had been removed and possibly reused as the waterfront was gradually advanced and new revetments constructed further south into the Thames channel.

8.6 The dating of the waterfronts at the Adelphi Building is therefore dependent on the evidence provided by the pottery sequence and the coin SF 18 recovered from the orange sand and gravel foreshore horizon which sealed three of the four revetment structures (The silver coin dated *c.* AD 710-760 from the earlier foreshore deposits is likely to be intrusive). The pottery found in the deposits which pre-date the establishment of the earliest revetment was not closely dateable and fell in to the wide bracket of AD 600-750. The coin, however, provides a very good dating marker in the sequence as it did not appear to be worn and had probably not been in circulation for an extended period before it was lost. The foreshore horizon from which it was recovered also provided an unmistakable horizon in the stratigraphic sequence. The three earlier waterfront structures lay below this foreshore deposit which contained the coin, provisionally dated AD 655-75, and a pottery assemblage broadly dated AD 600-850. The pottery assemblage is clearly of little help but two of the three waterfront dumping and levelling deposits [95-97] which sealed the orange foreshore horizon contained ceramic groups dated AD 700-750. The stratigraphic sequence demonstrates that three of the waterfront structures probably date to the third quarter of the seventh century, though they might be a little earlier, whilst Waterfront 4 was probably constructed in the late seventh or early eighth century.

8.7 The results from the Adelphi Building broadly concur with the dates suggested for the establishment of the Middle Saxon waterfront by the archaeological and documentary sources. The post and plank revetment recorded at York Buildings contained six planks dated AD 670-690, the most closely dated of these was a plank which retained sapwood and bark dated AD 679. At Buckingham Street a piece if timber recovered from piling was dated AD 672 though this lacked sapwood and may belong to later structure (Cowie and Blackmore 2012, 14).

8.8 The earliest documentary reference to the Saxon port of London was made in a charter of Frithuwold, the ruler in Surrey, dated AD 672-74. Frithuwold was described in the

charter as a sub-king of Wulfhere, king of Mercia. He granted estates to Abbot Eorcenwald and Chertsey Abbey in numerous locations which included 'ten hides by the port of London, where ships come to land on the same river (the Thames) on the south side of the public way'. (translation in Whitelock 1995, 440-41).

8.9 The dating evidence recorded at York Building closely matches the documentary record though it might be pointed out that the charter clearly refers to a port that was already in existence by AD 672. It is of course unknown what this port consisted of but the charter might suggest that management and reinforcing of the natural river bank had begun by this time. The earliest waterfronts at the Adelphi Building could pre-date the writing of the charter, though there is no compelling evidence that they did.

8.10 The earlier parts of the archaeological sequence seen in the lift pit trench all relate to the natural bank and foreshore of the Thames and the subsequent management of the bank by the establishment and renewal of timber waterfront structures. The succession of levelling deposits associated with these waterfronts had raised ground level to 1.14m OD in the north and 0.79m OD to the south. These developments were recorded as Phases 1-6. The latest levelling layers associated with the waterfronts provided direct evidence of trade dating to the early eight century. These included pottery assemblage from Northern France, a German lava rotary quernstone and part of a barrel lid which is probably from central Europe and indicative of wine trading.

8.11 A fundamental change in the landuse of the area occurred in Phase 7 when the waterfront must have been moved further to the south, beyond the limits of the trench, and ground level raised considerably before the establishment of a new ground surface and the construction of the only building recorded during the excavation. The range of finds also begins to change in this period as objects indicative of domestic occupation and craft industries, which began to occur in Phase 6, become far more frequent. Antler working is attested for the first time. The sequence of dumping/levelling layers raised ground level to 1.63m OD. As discussed above the pottery recovered from these layers shows that the remodelling of the waterfront took place in the first half of the 8th century AD.

8.12 The fragment of the small building recorded in Phase 8 represents the only possible domestic structure recorded in the excavation of the Lift Pit trench. It could easily be argued with some justification that the two perpendicular sill beams found burnt *in situ* were not substantial enough to have supported a domestic dwelling of this period. However, the evidence of the surrounding deposits which appear to represent an external gravel surface to the west and an internal clay floor to the east strongly suggested that the documented remains were part of a building. These remnants were too fragmentary, due to later truncations, to be more fully interpreted but there can be little doubt that a new ground surface had been established at this level and structures erected on it. The external sand and gravel surface lay at 1.68m OD whilst the clay

floor was recorded at 1.72m OD. The building was covered by ash and fire debris and had undoubtedly burnt down.

8.13 No close date can be established for the construction of this building but the pottery dating sequence is very consistent and it must date to either the first half or middle of the 8th century AD. The layers below the building provided a date bracket of AD 700-750 whilst the later pits and ditches which truncated the building horizon contained pottery dated to after AD 770.

8.14 Phase 9 was characterised by the excavation of the pits and ditches which had truncated the building. A substantial east-west aligned ditch occupied the southern part of the trench. Once the ditch had been infilled the surface was covered by layer [11]. This quite loose sandy layer formed a distinct horizon below the later hard, possibly rammed, surfaces found in this area. This layer also contained considerable quantities of Roman ceramic building materials, including a box flue tile, and building stone. Building materials that derived from *Londinium* or its environs continued to be frequent throughout the deposits found in this phase. Other stone fragments included pieces of German lava quernstone and Millstone Grit. It thus appeared that the building recorded in Phase 9 was not replaced though it might be emphasised that the excavated area was extremely limited and structures might easily have been located beyond the boundaries of the trench.

8.15 Although no buildings were recorded in this phase there was abundant evidence of nearby occupation presented firstly by the intense activity represented by the sequence of large cut features and in the remnants of craft industries found mainly within the fills of these pits and ditches. Antler and bone working, connected principally to the production of combs, was well attested in this phase and most of the loom weights recovered from the excavation, including all of the more complete examples, were retrieved from Phase 9 deposits. The small spindle whorl (SF 39), that may be made from walrus ivory, provides further evidence of textile production. This phase was also notable for the elevated quantities of German lava quernstone fragments present.

8.16 As discussed above the more closely datable pottery assemblages recovered from the Phase 9 pits and ditches are consistently later than AD 770. This is of considerable interest as direct evidence of occupation dated to the later 8th century or early 9th centuries is rare in *Lundenwic*. Successive phases of buildings, probably associated with smithing, were recorded at 2-26 Shorts Gardens whilst only three of the buildings recorded at the Royal Opera House dated to this period. 28-30 James Street provides the only other known example of an occupied building dated to this period. (Cowie and Blackmore 2012, 111). Though no buildings were recorded in this phase at the Adelphi Building it is highly unlikely that the domestic and craft waste deposited within the cut features was transported to the site for disposal. The evidence recovered from Phases 8 and 9 strongly suggests that that the waterfront had been advanced some distance to

the south and the lower parts of escarpments which rise to the Strand and the former river bank had been directly occupied.

8.17 Occupation of the waterfront may have continued into Phase 10 though the landuse within the small area of excavation appears to have changed as the pits and ditches evident in Phase 9 were sealed by compacted surfaces which might represent external yards possibly a road. No limits were found to these surfaces and it is therefore impossible to define their function. The earlier surface, layer [10], had been truncated by a small pit which contained a near complete loom weight. This suggests that buildings continued to be occupied nearby. The surfaces sealed the earlier Phase 8 cut features which contained pottery dated to after AD 770. The latest surface in Phase 10 also contained pottery of the same date which suggests that this latest recorded phase of Saxon occupation dates to the fourth quarter of the eight century or possibly the beginning the ninth century. The highest level recorded on the latest surface, layer [7], was 1.98m OD.

8.18 Unfortunately the latest Middle Saxon deposits had been truncated when the post-medieval brick floor which formed part of Phase 11 was constructed, probably as part of a basement room. It was therefore impossible to identify any horizons which represented the definitive abandonment of *Lundenwic* or the disuse of the waterfront area.

8.19 No meaningful interpretation can be offered for the features recorded as parts of Phase 11 which consisted of the 18th-century brick floor mentioned above, the group of six large postholes seen in the north of the lift pit trench and the massive chalk foundation which occupied the entirety of Test Pit 1. The ground levels associated with all of these features had been truncated by the modern basement and these features were only seen as isolated fragments from the periods in which they were used.

9 Research Questions

9.1 Original Research Questions

9.1.1 The original broad research aims set out in the Written Scheme of Investigation (Meager 2013b) were:

- To determine if possible the date of the earliest human activity recorded in the area and the subsequent sequence of occupation, in particular any remains associated with Anglo-Saxon, medieval, post-medieval and Modern development of the site.

- To help further inform our overall understanding of past activity in the Strand area.

- To record any significant archaeological deposits which may be exposed during demolition or construction work.

9.1.2 Although excavation was on a limited scale no significant evidence was uncovered which suggested that the site was occupied prior to the Middle Saxon period. The earliest dated deposits which formed part of the Thames foreshore contained pottery which was produced after AD 600. Large quantities of Roman building material were evident but it is almost certain that all of this material was transported to the site from other locations.

9.1.3 The landuse of the small excavated area has been well documented for the Middle Saxon period though modern truncation and the limited scope of the interventions undertaken on the site precluded any meaningful interpretation of subsequent developments.

9.2 New Research Questions

9.2.1 How does the dating and development of the Middle Saxon waterfront sequence recorded at the Adelphi Building compare and contrast with that seen at York Buildings?

9.2.2 Can the results from the Adelphi Building excavation help refine the current dating, both archaeological and historical, for the establishment of the Middle Saxon waterfront in the Strand area?

9.2.3 Can the finds from the Adelphi Building excavation further our knowledge of trade patterns in the Middle Saxon period?

9.2.4 Does the location of the waterfront structures correspond to the projected line of the Middle Saxon waterfront in this area?

9.2.5 The Adelphi Building excavation provided a very rare opportunity to examine the development of the Middle Saxon waterfront. How does the documented development of the waterfront compare to the current model regarding the establishment, growth and decline of the Middle Saxon settlement?

9.2.6 Can the evidence of direct occupation of the waterfront area evident in the later phases recorded at the Adelphi Building be linked to the apparent depopulation of other sites in the main *Lundenwic* settlement?

9.2.7 Can the absence of loom weights from the earlier phases of waterfront development at the Adelphi be linked to a comparable absence on other Middle Saxon waterfront sites? Moreover, can the later occurrence and frequency of loom weights be linked to the apparent increase in textile production noted in the later 8th-century deposits at the Royal Opera House (Malcolm and Bowsher 2003, 168-70)?

9.2.8 Can the quantities of Roman building material present be equated to the systematic transportation of this material to the site from the ruined Roman city of *Londinium*?

9.2.9 Can the sources of some of the atypical Roman ceramic fabrics present be identified?

9.2.10 How does the pottery assemblage recovered from the site compare to those found within the main settlement of *Lundenwic*?

9.2.11 How does the pottery assemblage compare to those found in other English and Continental emporia of the Middle Saxon period?

9.2.12 A very large assemblage of animal bone, consisting of nearly 10,000 items, was recovered during the course of the excavation. This resource, the result of both hand collection and extensive sampling, comes from a well stratified and dated archaeological sequence. What can this assemblage tell us about the food supply, butchery and animal husbandry practised in *Lundenwic*?

9.2.13 Can the animal bone assemblage demonstrate changing patterns of food supply to the settlement? If so how do these compare to those documented in other areas of *Lundenwic*?

9.2.14 Does the animal bone assemblage recorded at the Adelphi Building show distinct differences from those recorded from the main settlement away from the waterfront?

9.2.15 Only a small quantity of fish bone was recovered from the excavation despite an extensive sampling strategy being employed. Does this suggest that fish formed a relatively small part of the Middle Saxon food source in *Lundenwic* despite the town's strong maritime connections?

9.2.16 Fish bones were only recovered from the later phases of the excavation which can be connected to direct occupation of the waterfront location. Does this suggest that fish only became a significant component of the diet in a later period or that this area of the waterfront was in no way connected with the landing of fish when it was used as a waterfront?

9.2.17 A small but important group of leather was recovered from the site. Can this material make a significant contribution to our knowledge of Middle Saxon leatherworking?

9.2.18 How does the corpus of leather found at the Adelphi Building compare to that known from other Middle Saxon sites in *Lundenwic* such as St Martin's Courtyard (Fowler and Taylor 2013)?

9.2.19 How does the evidence for crafts industries, notably bone and antler working and textile production, compare to other sites excavated in *Lundenwic*?

9.2.20 How does the frequency of the objects associated with craft industries alter as a result of the documented changes in landuse recorded at the Adelphi Building? Can these changes be linked to developments in the wider *Lundenwic* settlement?

9.2.21 A significant number of iron clench bolts associated with boat construction formed part of the metalwork assemblage. Can these objects advance our understanding of Middle Saxon shipbuilding techniques?

9.2.22 Analysis of the smaller roundwood elements used for wattle and brushwood identified the use of several unusual species. How do the roundwood elements identified at the Adelphi compared to those used on other Middle Saxon waterfronts?

9.2.23 Extensive work has been carried out on the environmental samples taken from the site. How does the environmental profile of the Adelphi Building site compare to other sites found on the higher ground within the main *Lundenwic* settlement?

9.2.24 Redeposited peat was found within some of the landfill deposits used behind the waterfront structures. Can analysis of the pollen and diatom assemblages within this sample provide evidence of the nature and origin of this peat, and perhaps an insight into the pattern of peat preservation in the Middle Saxon riverine landscape?

10 Contents of the Archive

10.1 Paper archive

169 context sheets
64 plans on 64 individual planning sheets
5 sections on 8 individual sheets
4 sheets of specialist timber drawings
48 Environmental sample sheets

10.2 Photographs

Digital photographs:

200 digital photographs were taken by site staff
4 digital photographs were taken by the unit photographer

10.3 Finds

Bone 54 boxes
Ceramic building material and stone 1 box and two crates
Leather 1 box
Pottery 1.5 boxes
Glass 0.5 box
Slag 1 box
Shell 3 crates
Timber 2 pieces currently refrigerated, remainder assessed and stored by I. Tyers.
Metal 1 box
A total of 81 small finds were collected. 9 other iron objects require x-ray identification and may be treated as small finds

10.4 Environmental Samples

48 environmental samples of differing sorts were taken. These included:
40 bulk soil samples
4 column samples
2 C^{14} samples
2 samples of loose wattlework
This list excludes the timber samples which were taken from posts for possible dendrochronology and/or C^{14} sampling. These are still being tested for their viability

11 Importance of the Results, Further Work and Publication Outline

11.1 Importance of the Results

11.1.1 Despite the decades of excavation work and post-excavation analysis which have increased our understanding of how the Middle Saxon town of *Lundenwic* developed and was eventually abandoned the waterfront area has remained largely unexplored. This is principally because large areas of the waterfront are covered by massive iconic buildings such as the Adelphi, the adjoining Shell building and the nearby Savoy Hotel. Redevelopment opportunities have been correspondingly rare and those which arose before 1990 were not subject to the stricter planning control relating to archaeology which was enforced thereafter. The pioneering work undertaken at York Buildings took place under difficult circumstances and access to the areas impacted by the development was limited, as were timescales. The excavation at the Adelphi Building, though very limited in its extent, represents one of the very few occasions when a controlled excavation has been undertaken on the Saxon Middle waterfront. Thus the results are both of local and regional importance.

11.1.2 The excavation at the Adelphi produced a clear stratigraphic sequence which documented changes in landuse and identified the earliest phases of waterfront development in the area. Although pottery was relatively scarce this primary dating tool, along with the Phase 5 coin, has provided a clear chronological framework for the documented progress of the site in the Middle Saxon period. Moreover, the Adelphi Building excavation demonstrated later developments in the waterfront area which were not apparent from previous excavations. As such it presents new research questions which might be addressed by subsequent excavation work in the area.

11.1.3 The strength of the stratigraphic sequence and its chronology should provide a sound framework for specialist study of all elements of the finds assemblage. This is particularly true for the massive animal bone assemblage which resulted both from hand collection and the extensive sampling strategy which was undertaken from the outset of the excavation. Good evidence was also recovered for craft industries and the changing nature of landuse in this waterfront location is already apparent from the distribution of these finds within the stratigraphic sequence.

11.1.4 Direct evidence of international trade was evident in several forms. Imported pottery formed a small but important part of the ceramic assemblage; German lava quernstone fragments were also apparent. The most unexpected and interesting evidence was perhaps provided by the barrel or cask fragments which might suggest a very early wine trade route with central Europe. Further analysis of the finds assemblage may

produce further evidence of maritime trade both with Continental Europe and other Middle Saxon emporia in England.

11.2 Further Work

11.2.1 The results of the archaeological work will be compared from other sites across *Lundenwic* but especially the other main waterfront site at 18-20 York Buildings. Evidence from other *wics* will also be consulted. Further attempts will be made to refine the dating of the sequence following the analysis stage of project.

Pottery

11.2.2 As mentioned above the pottery assemblage is the principal dating tool which provides a chronology for the development of the site. Lyn Blackmore (MOLA) should be consulted on the identification of some of the Middle Saxon pottery fabrics. A pottery report is required for the publication of the site. Emphasis will be made on comparing the assemblage to the other pottery groups from *Lundenwic* and other English and Continental *wic* waterfront sites. It is recommended that seven vessels are illustrated and used to supplement the text. Additionally a visit should be arranged LAARC to examine the archive of 18-20 York Buildings.

Loom weights

11.2.3 The publication for the Adelphi Building should contain a section dealing with the loom weights, four of which merit illustration. A comparison of the assemblage to others in *Lundenwic* in terms of composition and size should be considered for the publication and research of the 18-20 York Buildings excavation should be undertaken in order to determine if loom weights are associated or not with the waterfront deposits.

Building material

11.2.4 A very large assemblage of Roman building material was recovered during the course of the excavation. In addition to a section examining the importance and possible origin of the large stone and Roman brick dump at publication certain aspects of the assemblage warrant further analysis. An attempt should be made to identify whether a large group of atypical cream-orange soft worn Roman bricks can be matched with the London MOLSS Fabric collection. They resemble somewhat the late cream calcareous fabric *3013* (AD 140-300) but also earlier *3238* and *3054* fabrics. For the daub further visual fabric analysis and comparison should be made with existing studies of worked and burnt daub identified elsewhere in *Lundenwic*. Illustration of the box flue roller stamp and possibly the roller stamped brick, whetstones and quernstones should be undertaken.

Timber

11.2.5 Some notable fragments of timber, particularly the cask or barrel lids, were recovered at the Adelphi Building. This small assemblage of woodwork also has clear potential for shedding much more light on the construction, appearance and use of the waterfront of *Lundenwic*. It also has the potential to shed light on the form and construction of wooden import containers in the form of casks which are little known at this period, and seemingly evidence of the early re-emergence of the northern limb of the European wine trade. This evidence can also be set beside that of the study of imported pottery (and perhaps the quernstones) found at the site. The assemblage also has potential to shed light on the varied nature of the wooded hinterland of Middle Saxon London long before Domesday. It is already clear that most of the material used on the site was produced from managed woodlands but further analysis will be needed to characterise them contrasting with evidence for the harvesting of high 'wildwood-type' forest at the same period. It is suggested that an updated, fully referenced text relating to the timber is produced with *c.*5 draft figures. The analysis/publication draft would include subjects outlined just above but also a brief comparison of the cooperage woodwork with slightly later finds from Bull Wharf ('Aethelreds Hithe') and contemporary Middle Saxon Ipswich and Southampton.

Glass

11.2.6 The small glass assemblage merits further detailed study, including chemical analysis to determine its date.

Metal and small finds

11.2.7 A significant assemblage of metal and small finds was recovered at the Adelphi Building. Publication is recommended for the finds assemblage in its entirety, with further research in particular of the bone- and antler-working waste and the iron clench bolts. Detailed studies of the nail shank for shape and wood grain can be shown to be informative on boat construction as well as dating. For the purpose of publication and further analysis, the pale gold coin requires full identification and XRF analysis for metal content while the two corroded coins (sf 8 and 21) which have been cleaned by a conservator need further identification. All other metal objects (28 individual pieces) require x-raying.

Animal bone

11.2.8 The size, quality and importance of the animal bone assemblage have already been commented on above. Detailed observations and recommendations regarding this assemblage are given in the assessment prepared for this report. In short, "this assemblage clearly deserves a detailed examination owing to its good state of preservation, its size and also the exemplary methods of recovery employed in its production. It will certainly provide a very useful addition to the data already gathered concerning this Middle Saxon settlement".

Fish bone

11.2.9 The publication should include a report on the fish bone comparing the remains to other assemblages from *Lundenwic.*

Environmental

11.2.10 Much of the material recorded in the column samples is not in its primary depositional context, but has been brought to the site from elsewhere and dumped. This must be borne in mind with any possible radiocarbon dates from it and any further analysis of its microfossil content (pollen and diatoms) would provide only a very generalised indication of local environments in the source area. Perhaps the most interesting deposit in this respect is the material preserved in column <48> (contexts [97] and [99], which appears to have been mainly derived from a pre-existing peat bed. Further analysis of the pollen and diatom assemblages within this sample could provide evidence of the nature and origin of this peat, and perhaps an insight into the pattern of peat preservation in the Middle Saxon riverine landscape. With regard to the semi-natural waterlaid and foreshore deposits recorded in column <47>, unfortunately the gravelly and sandy nature of these deposits means that their microfossil content is likely to be sparse and its diversity restricted. No further analysis is therefore recommended on this sample.

With regards to the bulk samples, the interpretation of the Mollusca assemblages must be treated with great caution because the deposits from which the samples came comprise material, possibly from more than one source, redistributed in Saxon times in connection with building activity on the site. There is also the possibility that some of the mollusc remains relate to populations living on the site after the redistributed material was put in place. It is not possible therefore to be sure that the sample material in individual samples all came originally from the same natural depositional environment. If it did, the most likely habitat would seem to be a moist floodplain surface, which is consistent with the location of the Adelphi Building site close to the Holocene floodplain of the Thames. Because of the problems relating to the integrity of the Mollusca assemblages, their contamination with food waste and their origin in deposits of redistributed sediment and soil, it is recommended that no further investigation of the these faunas be undertaken.

With regards to the macrofossils, additional analysis of the charcoal assemblages may determine if any of the fragments retain anatomical characteristics suggestive of silvicultural practises such as coppicing. On the basis of the diversity of the assemblages recorded here, it seems unlikely that additional analysis of the seeds will yield additional information on the nature of the redeposited peat recorded in contexts [97] and [99]; however, it is possible that analysis of the seed assemblages or insects in any features of archaeological interest may yield additional information on the nature of the environment at the time of deposition, as well as the character of agricultural

practices. Additional analysis of the four samples already assessed for their insect remains is unlikely to yield any further information on the type of activities taking place at the site, or the general environmental context.

Oyster shell

11.2.11 A large oyster shell assemblage was analysed following the conclusion of the Adelphi Building excavation. The oyster shells that were recovered from the Adelphi Building site date to the Middle Saxon period, having been deposited by the citizens of the extramural trading centre of *Lundenwic*. As yet, few opportunities to investigate the waterfront of this important settlement have arisen and as such any archaeological finds relating to it are of the upmost importance. This statement can be applied to the entire content of the Adelphi Building archive, including the oyster shell assemblage that is discussed here. As such, it is recommended that the qualitative and quantitative data that was gleaned from the two statistically viable samples that were identified during the course of this assessment is further analysed at the publication stage in order to determine the likely origin of the shells and the methods that were used to collect and process them. This will further our understanding of the trading and fishing routes that were available to the residents of *Lundenwic* and better our knowledge of their technology and diet.

Leather

11.2.12 A small but significant group of leather was recovered from the excavation. Leather from the Middle Saxon period is extremely rare. This assemblage therefore merits further study. It is suggested that a small number of samples are submitted from radiocarbon dating: the samples should include a sample from context [97] which contains the shoe fragments. The leather should then be conserved. The leather should be re-examined after conservation and any additional features noted, then the basic record should be completed for inclusion in the site archive. The working drawings can be updated where necessary. The pieces of shoe leather in context [97] should be studied to allow the items to be categorised if possible, dated and any comparanda identified. The data can then be correlated with the site context information. A report on the leather should be prepared to inform those preparing the site narrative and for publication. The report will summarise the material and consider the assemblage in context regarding the other leather of Middle Saxon date recovered previously from London and the rest of Britain. The shoe leather should be illustrated with line drawings; the waste leather may be best illustrated by photography.

Slag

11.2.13 No further work is required.

Further dating

11.2.14 A number of wattle rods and other timber samples were taken for possible radiocarbon dating. However, it is felt unlikely that any radiocarbon dating will improve on the dating of the sequence as provided by the pottery and coin assemblage. The pottery assemblage includes all the main four phases of Middle Saxon *Lundenwic* and these appear in their correct order in the archaeological sequence. This framework together with the coin assemblage, especially the gold thrymsa from the Phase 5 foreshore and the silver sceat from a Phase 9 pit, and the comparative evidence from York Buildings which had a timber waterfront dated by dendrochronology to the AD 670s (Cowie 1992) should provide a robust dating for the Adelphi Building archaeological sequence (see matrix Appendix 2). It should also be noted that whilst calibrated radiocarbon dates for the 7th century span less than half a century at 68% probability and less than a century at 95% probability, calibrated radiocarbon dates span more than a century (at both 68% and 95% probability) for the 8th century because of a micro-plateau in the calibration curve (Bayliss *et al.* 2013, 35). However, it is acknowledged that the use of radiocarbon dating to provide a basis for the wiggle matching of possible dendrochronological samples or for Bayesian analysis should not be precluded until the relevant scientific advice from specialists in the field has been sought following the dissemination of the results presented in this report.

11.3 Publication Outline

11.3.1 Because of the regional and potentially national importance of the archaeological results it is proposed that they be the subject of an article in a national peer reviewed journal such as *Medieval Archaeology* or *Archaeological Journal.* The publication of the investigations will focus on the Middle Saxon waterfront with an emphasis placed on understanding the site within the settlement *Lundenwic.*

11.3.2 A proposed outline of the publication is detailed below:

- Introduction to the Project
- Historical and Archaeological Background
- Archaeological Sequence
- Specialists reports to include pottery, glass, loom weights, coins, small finds, building material, animal bone, fish bone, leather, oyster shell and environmental evidence
- Discussion
- Acknowledgements
- Bibliography

12 Acknowledgements

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12.5 The vast majority of the site photography was undertaken by Douglas Killock; Strephon Duckering is also thanked for his initial site visit, photography and his invaluable advice regarding the challenges of undertaking photography in a dimly lit basement.

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APPENDIX 1: Context Index

Context No.	Plan	Section/ Elevation	Trench	Type	Description	Date	Phase
1			TP 1	Layer	Concrete slab	Modern	12
2			TP 1	Layer	Stiff clay	Modern	12
3			TP 1	Masonry	Chalk and flint footing	Medieval?	11
4			TP 2	Layer	Possible feature fill or dump	Middle Saxon?	10
5			TP 3	Layer	Possible feature fill or dump	Middle Saxon?	10
6			TP 3	Layer	Lense within [4]	Middle Saxon?	10
7	7	1, 2	Lift Pit	Layer	Very compact stony surface	Middle Saxon	10
8			Lift Pit	Fill	Fill of pit [9]	Middle Saxon	10
9	9		Lift Pit	Cut	Circular pit	Middle Saxon	10
10	10		Lift Pit	Layer	Very compact stony surface	Middle Saxon	10
11	11		Lift Pit	Layer	Sandy make-up or surface	Middle Saxon	9
12		1	Lift Pit	Fill	Fill of pit [13]	Middle Saxon	9
13	13	1	Lift Pit	Cut	Circular pit	Middle Saxon	9
14		1	Lift Pit	Fill	Upper fill of ditch [14]	Middle Saxon	9
15	14	1	Lift Pit	Cut	E-W aligned ditch	Middle Saxon	9
16			Lift Pit	Fill	Upper fill of pit [18]	Middle Saxon	9
17			Lift Pit	Fill	Lower fill of pit [18]	Middle Saxon	9
18	18		Lift Pit	Cut	Sub-rectangular pit	Middle Saxon	9
19	19		Lift Pit	Layer	Heavily compacted layer sealing destruction horizon of Saxon building	Middle Saxon	9
20			Lift Pit	Fill	Fill of pit [21]	Middle Saxon	9
21	21		Lift Pit	Cut	Truncated fragment of pit	Middle Saxon	9
22	22		Lift Pit	Layer	Heavily truncated silty clay layer above building	Middle Saxon	8
23	23		Lift Pit	Layer	Grey ash layer?	Middle Saxon	8
24	24		Lift Pit	Layer	Thin layer of decayed wood/charcoal	Middle Saxon	8
25	25		Lift Pit	Timber	Burnt timber beams, formed right angle	Middle Saxon	8
26	26	1	Lift Pit	Layer	Possible burnt clay floor	Middle Saxon	8

27	27		Lift Pit	Cut	Construction cut for beams [25]	Middle Saxon	8
28	28	1	Lift Pit	Layer	Burnt clay, possible floor surface	Middle Saxon	8
29	29	1	Lift Pit	Layer	Very heavily truncated sliver of burnt wood below [28]	Middle Saxon	8
30	30	1	Lift Pit	Layer	Very heavily truncated make-up layer	Middle Saxon	8
31	31		Lift Pit	Layer	Grey ash layer?	Middle Saxon	8
32	32		Lift Pit	Layer	Heavily truncated layer	Middle Saxon	8
33	33		Lift Pit	Layer	External surface associated with timber beams [25]	Middle Saxon	8
34	34		Lift Pit	Layer	Make-up layer consisting largely of fire debris (frags of burnt clay)	Middle Saxon	8
35	35	1, 5	Lift Pit	Layer	Oyster shell midden	Middle Saxon	7
36	36		Lift Pit	Fill	Fill of ditch [15]	Middle Saxon	9
37			Lift Pit	Fill	Fill of small pit [38]	Middle Saxon	7
38	38		Lift Pit	Fill	Small pit	Middle Saxon	7
39	39		Lift Pit	Layer	Highly organic dump layer	Middle Saxon	7
40		1	Lift Pit	Fill	Fill of pit [13], recorded only in S1	Middle Saxon	9
41		1	Lift Pit	Fill	Fill of pit [13], recorded only in S1	Middle Saxon	9
42		1	Lift Pit	Fill	Fill of pit [13], recorded only in S1	Middle Saxon	9
43			Lift Pit	Layer	Oyster shell dump in sandy silt matrix	Middle Saxon	9
44		1	Lift Pit	Masonry	Fragment of brick floor	Post-Medieval	11
45		1	Lift Pit	Cut	Poss construction cut for brick floor [44]	Post-Medieval	11
46	46		Lift Pit	Layer	Levelling layer for slab	Modern	12
47			Lift Pit	Fill	Fill of posthole [48]	Post-Medieval	11
48	48		Lift Pit	Cut	Posthole	Post-Medieval	11
49			Lift Pit	Fill	Fill of posthole [50]	Post-Medieval	11
50	50		Lift Pit	Cut	Posthole	Post-Medieval	11
51			Lift Pit	Fill	Fill of posthole [52]	Post-Medieval	11
52	52		Lift Pit	Cut	Posthole	Post-Medieval	11
53	53		Lift Pit	Layer	Sand layer, possibly burnt	Middle Saxon	9
54			Lift Pit	Fill	Upper fill of pit [57]	Middle Saxon	9
55			Lift Pit	Fill	Fill of pit [57]	Middle Saxon	9
56			Lift Pit	Fill	Lower fill of pit [57]	Middle Saxon	9

57	57		Lift Pit	Cut	Shallow pit	Middle Saxon	9
58	58		Lift Pit	Layer	Heavily truncated dump/levelling layer	Middle Saxon	9
59	59		Lift Pit	Layer	Silty ashy layer	Middle Saxon	9
60	60	3	Lift Pit	Layer	Layer of burnt daub	Middle Saxon	9
61	61	3	Lift Pit	Layer	Oyster shell midden	Middle Saxon	9
62		3	Lift Pit	Layer	Silty ashy layer	Middle Saxon	9
63	63	3	Lift Pit	Layer	Dump/levelling layer with a large oyster shell element	Middle Saxon	7
64	64		Lift Pit	Layer	Dump/levelling layer with a large oyster shell element	Middle Saxon	7
65		3	Lift Pit	Fill	Fill of shallow cut [66]	Middle Saxon	7
66	66	3	Lift Pit	Cut	Shallow cut	Middle Saxon	7
67	67		Lift Pit	Layer	Silty organic dump	Middle Saxon	7
68	68	3	Lift Pit	Layer	Clay bank	Middle Saxon	7
69			Lift Pit	Fill	Fill of posthole [70]	Post-Medieval	11
70	70		Lift Pit	Cut	Posthole	Post-Medieval	11
71			Lift Pit	Fill	Fill of posthole [72]	Post-Medieval	11
72	70		Lift Pit	Cut	Posthole	Post-Medieval	11
73			Lift Pit	Fill	Fill of posthole [74]	Post-Medieval	11
74	70		Lift Pit	Cut	Posthole	Post-Medieval	11
75	75		Lift Pit	Layer	Dump/levelling layer at north end of trench. High organic content in places with wattle/brushwood	Middle Saxon	6
76	76	3	Lift Pit	Layer	Dark silty organic layer. Recorded only in S3	Middle Saxon	6
77		3	Lift Pit	Fill	Fill of small pit [78]. Recorded only in S3	Modern	12
78		3	Lift Pit	Cut	Small pit, possible modern intrusion. Recorded only in S3	Modern	12
79		3	Lift Pit	Layer	Heavily truncated layer. Recorded only in S3	Middle Saxon	9
80		3	Lift Pit	Layer	Sandy clay layer. Recorded only in S3	Middle Saxon	9
81		3	Lift Pit	Layer	Compacted ash layer. Possibly the same as [81]. Recorded only in S3	Middle Saxon	9

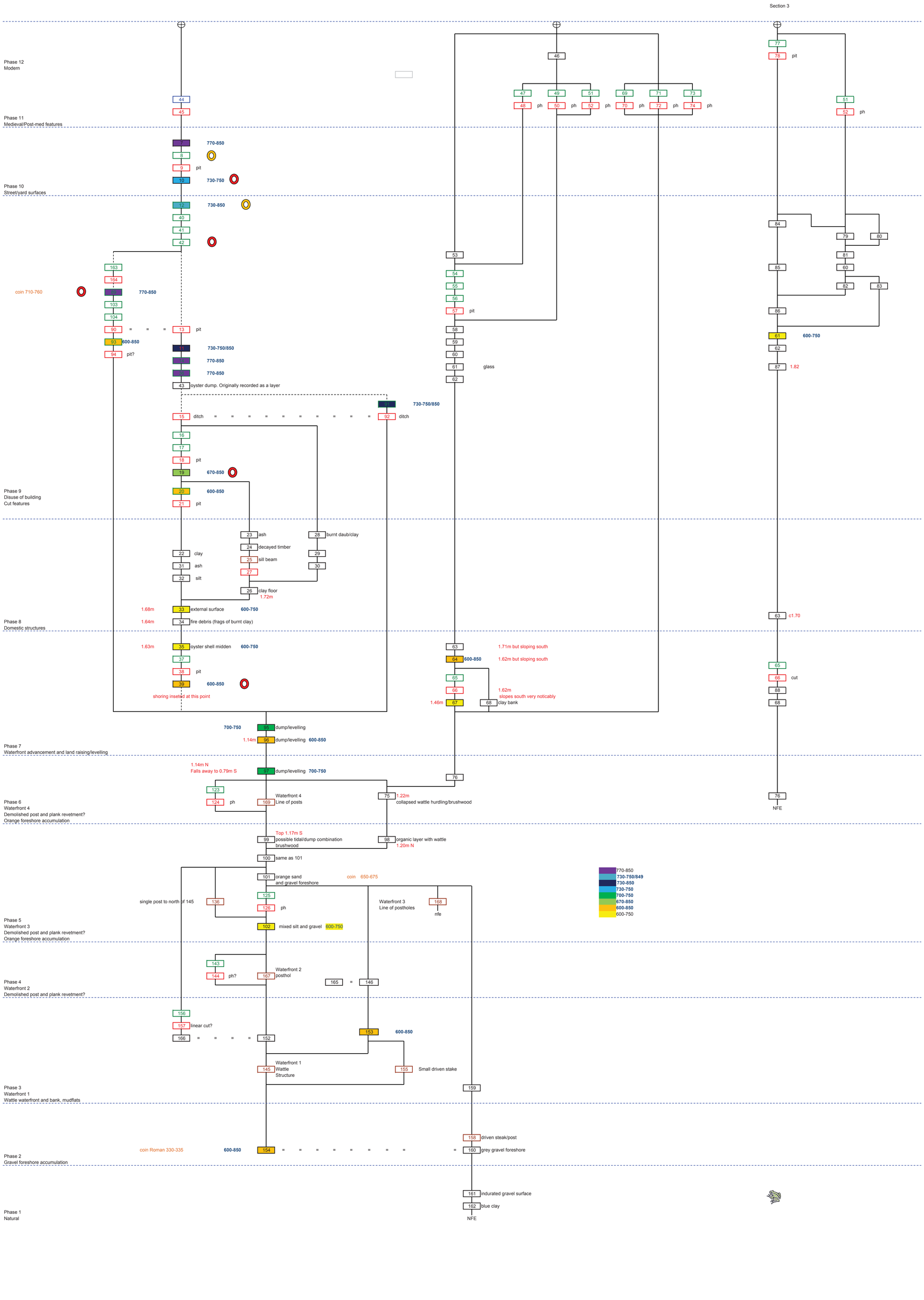
82		3	Lift Pit	Layer	Greenish silty clay layer. Recorded only in S3	Middle Saxon	2
83		3	Lift Pit	Layer	Burnt clay layer. Recorded only in S3	Middle Saxon	9
84		3	Lift Pit	Layer	Bright orange stony sand. Recorded only in S3	Middle Saxon	9
85		3	Lift Pit	Layer	Soft stony silty clay layer. Recorded only in S3	Middle Saxon	9
86		3	Lift Pit	Layer	Mixed silt and fire debris. Recorded only in S3	Middle Saxon	9
87		3	Lift Pit	Layer	Shell midden. Recorded only in S3	Middle Saxon	9
88		3	Lift Pit	Layer	Very soft organic layer, possibly the same as [67]. Recorded only in S3	Middle Saxon	7
89		4, 5	Lift Pit	Fill	Fill of pit [90]	Middle Saxon	9
90	90	4, 5	Lift Pit	Cut	Pit. Same as [13]?	Middle Saxon	9
91		4	Lift Pit	Fill	Fill of ditch [92]	Middle Saxon	9
92	92	4	Lift Pit	Cut	Ditch. This is the base of ditch cut [15]	Middle Saxon	9
93		5	Lift Pit	Fill	Fill of [94]	Middle Saxon	9
94	94	5	Lift Pit	Cut	Heavily truncated fragment of cut	Middle Saxon	9
95	95	4, 5	Lift Pit	Layer	Extensive dumping horizon in south side of trench	Middle Saxon	7
96	96		Lift Pit	Layer	Mixed dumping horizon in south side of trench	Middle Saxon	7
97	97	4, 5	Lift Pit	Layer	Mixed dumping horizon in south side of trench. Located to N of timber structures	Middle Saxon	6
98	98	5	Lift Pit	Layer	Organic woody silt layer located in northern half of trench. Possibly mixed dumping and inundation	Middle Saxon	5
99	99	4, 5	Lift Pit	Layer	Layer of alternating lenses of sandy gravel and riverine silts. South side of trench	Middle Saxon	5
100	100	5	Lift Pit	Layer	Orange sand and gravel foreshore material. North side of trench	Middle Saxon	5
101	101	4, 5	Lift Pit	Layer	Orange sand and gravel foreshore material. South side of trench	Middle Saxon	5

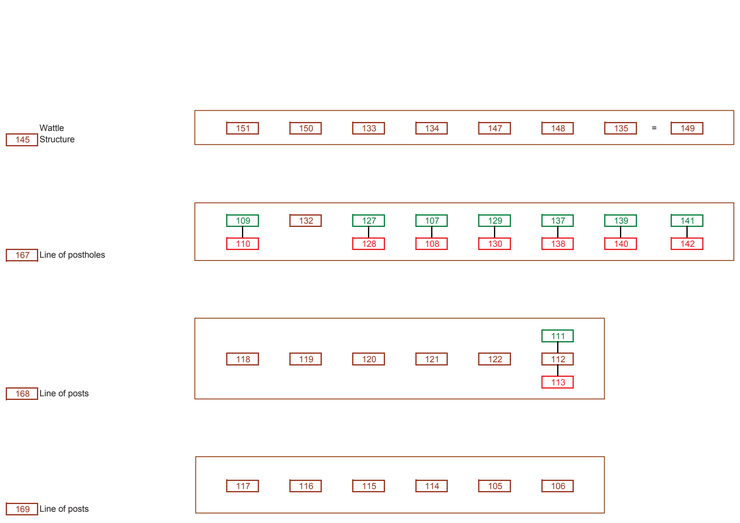
102	102		Lift Pit	Layer	Soft bluish grey silty mudflat horizon, extends below orange foreshore horizon	Middle Saxon	5
103		4	Lift Pit	Fill	Fill of pit [90]	Middle Saxon	9
104		4	Lift Pit	Fill	Primary fill of pit [90]	Middle Saxon	9
105	105	4	Lift Pit	Timber	Decayed driven post	Middle Saxon	6
106	105	4	Lift Pit	Timber	Decayed driven post	Middle Saxon	6
107			Lift Pit	Fill	Fill of posthole [108]	Middle Saxon	4
108	105		Lift Pit	Cut	Posthole	Middle Saxon	4
109			Lift Pit	Fill	Fill of posthole [110]	Middle Saxon	4
110	105		Lift Pit	Cut	Posthole	Middle Saxon	4
111			Lift Pit	Fill	Fill of posthole [113]	Middle Saxon	5
112			Lift Pit	Timber	Decayed driven post in [113]	Middle Saxon	5
113	105		Lift Pit	Cut	Posthole	Middle Saxon	5
114	105		Lift Pit	Timber	Decayed driven post	Middle Saxon	6
115	105		Lift Pit	Timber	Decayed driven post	Middle Saxon	6
116	105		Lift Pit	Timber	Driven post	Middle Saxon	6
117	105		Lift Pit	Timber	Driven post	Middle Saxon	6
118	105		Lift Pit	Timber	Driven post	Middle Saxon	5
119	105		Lift Pit	Timber	Driven post	Middle Saxon	5
120	105		Lift Pit	Timber	Driven post	Middle Saxon	5
121	105		Lift Pit	Timber	Driven post	Middle Saxon	5
122	105		Lift Pit	Timber	Driven post	Middle Saxon	5
123			Lift Pit	Fill	Fill of posthole [124]	Middle Saxon	7
124	105		Lift Pit	Cut	Posthole	Middle Saxon	7
125			Lift Pit	Fill	Fill of posthole [126]	Middle Saxon	5
126	105		Lift Pit	Cut	Posthole	Middle Saxon	5
127			Lift Pit	Fill	Fill of posthole [128]	Middle Saxon	4
128	105		Lift Pit	Cut	Posthole	Middle Saxon	4
129			Lift Pit	Fill	Fill of posthole [130]	Middle Saxon	4
130	105		Lift Pit	Cut	Posthole	Middle Saxon	4
131			Lift Pit		VOID	na	na
132	105		Lift Pit	Timber	Driven post	Middle Saxon	4
133	105, 145		Lift Pit	Timber	Driven post	Middle Saxon	3

134	105, 145		Lift Pit	Timber	Driven post	Middle Saxon	3
135	105, 145		Lift Pit	Timber	Driven post	Middle Saxon	3
136	105		Lift Pit	Timber	Driven post	Middle Saxon	5
137			Lift Pit	Fill	Fill of posthole [138]	Middle Saxon	4
138	105		Lift Pit	Cut	Posthole	Middle Saxon	4
139			Lift Pit	Fill	Fill of posthole [140]	Middle Saxon	4
140	105		Lift Pit	Cut	Posthole	Middle Saxon	4
141			Lift Pit	Fill	Fill of posthole [142]	Middle Saxon	4
142	105		Lift Pit	Cut	Posthole	Middle Saxon	4
143			Lift Pit	Fill	Fill of posthole [144]	Middle Saxon	4
144	105		Lift Pit	Cut	Posthole	Middle Saxon	4
145	145		Lift Pit	Structure	Wattle structure	Middle Saxon	3
146	146		Lift Pit	Layer	Bluish grey silt. To north of [145]	Middle Saxon	4
147	145		Lift Pit	Timber	Driven post. Part of [145]	Middle Saxon	3
148	145		Lift Pit	Timber	Driven post. Part of [145]	Middle Saxon	3
149	145		Lift Pit	Timber	Driven post. Part of [145]	Middle Saxon	3
150	145		Lift Pit	Timber	Driven post. Part of [145]	Middle Saxon	3
151	145		Lift Pit	Timber	Driven post. Part of [145]	Middle Saxon	3
152	152		Lift Pit	Layer	Bluish grey silt. To south of [145]	Middle Saxon	3
153	153		Lift Pit	Layer	Embankment to north of wattle structure [145]	Middle Saxon	3
154	154	5	Lift Pit	Layer	Grey sandy foreshore layer	Middle Saxon	2
155	155		Lift Pit	Timber	Small driven stake	Middle Saxon	3
156		5	Lift Pit	Fill	Fill of [157]	Middle Saxon	3
157		5	Lift Pit	Cut	Possible linear cut seen in Section 5	Middle Saxon	3
158		5	Lift Pit	Timber	Driven post	Middle Saxon	2
159		5	Lift Pit	Layer	Mixed waterlain organic and silt lenses	Middle Saxon	3
160		5	Lift Pit	Layer	Sandy foreshore deposit	Middle Saxon	2
161		5	Lift Pit	Layer	Indurated gravel	Middle Saxon	1
162		5	Lift Pit	Layer	Natural blue clay	Middle Saxon	1
163		5	Lift Pit	Fill	Fill of pit [164]	Middle Saxon	9
164		5	Lift Pit	Cut	Pit. Part of [90], possible recut	Middle Saxon	9
165		5	Lift Pit	Layer	Grey silt and gravel	Middle Saxon	4
166		5	Lift Pit	Layer	Grey silt and gravel	Middle Saxon	3

167	167		Lift Pit	Structure	Waterfront 2	Middle Saxon	4
168	168		Lift Pit	Structure	Waterfront 3	Middle Saxon	5
169	169		Lift Pit	Structure	Waterfront 4	Middle Saxon	6

APPENDIX 2: Site Matrix





APPENDIX 3: Pottery Assessment

Chris Jarrett

Introduction

A small sized assemblage of pottery was recovered from the site (two boxes). The pottery dates from the Roman, Middle Saxon and early medieval periods. Relatively very few sherds show evidence for abrasion (less than 5.3% by sherd count) and so were probably deposited fairly rapidly after breakage. However, a small number of vessels are noted as having family sherds recorded in several different contexts. The fragmentation of the pottery consists entirely of sherd material although forms could be identified. The pottery was quantified by sherd count (SC) and estimated number of vessels (ENV's), besides weight. Pottery was recovered from 24 contexts and as small (fewer than 30 sherds) and one medium (less than 100 sherds) sized group.

The assemblage consists of 147 sherds/ 93 ENV/2.259kg of which three sherds/3 ENV/53g are unstratified. The assemblage was examined macroscopically and microscopically using a binocular microscope (x20), and recorded in an ACCESS database, by fabric, form and decoration. The classification of the pottery types is according to the Museum of London Archaeology and the most recent description of Middle Saxon pottery types found in *Lundenwic* are referenced to Blackmore (2012). The pottery is discussed by types and its distribution.

The Pottery Types

The quantification of the pottery for each post-Roman archaeological period is as follows:

Roman: two sherds, 2 ENV, 403g

Middle Saxon: 144 sherds, 89 ENV, 1.843kg

Medieval: one sherd, 1 ENV, 13g

Roman

The two sherds of Roman pottery both consist of fragments of amphora (AMPH), dated AD 40-400. Both sherds were residual and found in contexts [64] and [89].

Middle Saxon

The Middle Saxon pottery types and their forms present in the assemblage are shown in Table1.

Fabric code	Expansion and description	Date range	SC	ENV	Weight (g)	Form

Fabric code	Expansion and description	Date range	SC	ENV	Weight (g)	Form
Chaff-tempered wares						
CHAF	Abundant organic temper in London Clay or brickearth	450-750	4	4	79	Jar
CHFS	As CHAF, but moderate quartz sand with sparse flint and/or chert	450-750	3	3	36	Jar
CHSF	As CHAF, brickearth with very fine sand, sparse organic matter	450-750	9	5	201	Jar: rounded
Ipswich ware						
IPSC	Ipswich coarse ware	730-850	6	6	91	Jar
IPSF	Ipswich fine ware	730-850	58	29	662	Jar, pitcher
IPSM	Ipswich intermediate ware	730-850	3	3	93	Jar
Sand-tempered wares						
SSAN	Miscellaneous sand-tempered ware	600-850	1	1	15	
SSANA	Sand-tempered, coarse pink-brown core, black surfaces	600-850	3	2	53	Jar: rounded
SSANB	Sand-tempered (medium), grey-black throughout (?Hampshire)	600-850	7	5	96	Jar: rounded
SSAND	Sand-tempered (fine), grey-black throughout, burnished	600-850	7	6	140	Jar: rounded
SSANE	Sand-tempered (fine), pale grey	600-850	1		1	
MISC MS	Miscellaneous Middle Saxon pottery	600-850	4	2	13	
Shell-tempered wares						
MSS	Shell-tempered ware	770-850	7	7	66	Jar
Imported wares						
BADO	Badorf ware	670-850	6	1	72	
BEAV	Beauvais-type white ware	700-850	1	1	3	
MSRW	Imported redware	700-850	4	2	85	Pitcher
MISC	Miscellaneous imported Middle Saxon pottery	600-820	1	1	21	
MSRWA	Imported redware type A (fine oxidised ware)	700-850	1	1	9	
MSWW	Imported whiteware (umbrella code)	600-850	3	3	29	
NFGW	north French greyware	600-850	8	5	67	Pitcher
NFGWA	north French greyware	600-850	1	1	2	
NFSVB	N French/Seine Valley buffware, medium sandy	700-850	1	1	9	Jar/pitcher

Table 1. JAD14. Middle Saxon pottery types. SC: sherd count; ENV: estimated number of vessels.

Handmade chaff-tempered wares, dated AD 450-750, are found in the assemblage as a total of 16 sherds/12 ENV/316g and occur as three sub-types: CHAF, CHFS and CHSF and these are the main fabrics recorded in this tradition that are found in *Lundenwic*. The only form found in the chaff-tempered wares are jars and only one example made in CHSF showed evidence, by the presence of external sooting and an internal food deposit, for being used as a cooking pot (context [97]). Most sherds of the chaff-tempered wares showed evidence for wiped surfaces, while a small number of sherds in CHFS and CHSF, which includes the cooking pot, have burnished surfaces.

The Middle Saxon handmade sand-tempered wares, dated AD 600-850, are recorded as a total of 24 sherds/15 ENV/305g and occur as the types most frequently found in *Lundenwic*: SSANA, SSANB, and SSAND, with additionally single sherds noted in the SSANE fabric and a miscellaneous ware (SSAN). Two sherds have wiped surfaces, while burnishing was only noted on five sherds of the SSAND fabric. Only rounded jar shaped vessels are noted in these wares and a small sized example was made in SSANB (context [96]), while a medium sized form, also made in SSANB, and was found in context [97]. Cooking pots, identified by sooting and food deposits were more frequent in the sand-tempered wares compared to that of the chaff-tempered wares.

There are additionally three sherds of miscellaneous Middle Saxon sand-tempered ware which are too abraded or small in size to confidently assign to a fabric type. Additionally a sherd from context [95] appears to be a greensand-tempered ware and requires further identification.

The wheel-finished Ipswich wares, which occur in *Lundenwic* over the period AD 730-850, are found as a total of 67 sherds/38 ENV/846g and are recorded mostly in the form of jar-shaped vessels with evidence for rilled shoulders and wiped or burnished surfaces. None of the Ipswich ware vessels show evidence for being used as cooking pots, although an IPSF sherd from context [10] has a faint red (possible rust) deposit. Additionally an IPSF pitcher was identified in context [14] and a possible bowl rim came from context [11]. From context [14] there is also in IPSF decorated sherd with pairs of incised lines forming polygonal shapes, which surround small segmented square stamps. The latter is difficult to parallel in the Ipswich ware stamp corpus (Blinkhorn 2012, 57, fig. 29)

The shell-tempered wares (MSS), dated *c.* AD 770-850 have only been placed under an umbrella code (MSS) as the different types are largely determined by thin-section and chemical analysis (Blackmore 2012, 247-9). These wares are a small proportion of the assemblage (seven sherds/7 ENV/66g), although they are in themselves an important dating tool. Jars are the most likely form recorded amongst the fragmentary shell-tempered wares, with only an identifiable shoulder sherd noted in context [89], while two sherds recorded in context [14] are sooted and were therefore used for cooking or heating water.

The imported Middle Saxon pottery is recorded as a total of 26 sherds/16 ENV/297g (18.1% SC/17.8% MNV/16.1% weight). These wares come from a number of sources: Germany/The Rhineland; BADO, MSRW/A, France; BEAV, NVSVB, NFGWA and unknown Continental sources for some of the whitewares; MSWW. The forms in these wares were difficult to identify, although closed vessels are probably represented by all of the sherds. Pitchers could be identified by rims and strap handles found in fabrics MSRW (contexts [35] and [97]) and NFGW/A (context [97]) while a jar or pitcher rim is noted in NFSVB (context [7]). However, the latter was externally sooted and contained a possible internal deposit, indicating that it was either used for cooking or heating a liquid. Decoration on other sherds consisted of a band of

rouletted notch decoration present on sherds of NFGW (contexts [61] and [65]), besides red-painted possible 9th-century dated decoration on BEAV (context [7]).

Medieval

A single rim sherd from a jar made in Early Surrey ware (ESUR), dated 1050-1150 (Vince and Jenner 1991) was found in context [14] and it is presumed to be intrusive.

Distribution

The distribution of the pottery is shown in Table 2 which conveys for each context containing pottery its phasing, size, the number of sherds and ENV, besides weight. Additionally the date range of the latest pottery is shown (Context ED and LD), the types of pottery present and a considered deposition date (spot date). The distribution of the pottery by each phase is discussed. The pottery was recovered from Phases 2-3 and 5-11.

Phase 2

Only two sherds of pottery/1 ENV/43g of pottery were recorded in this phase and solely derived from layer [154] as sherds of a sand-tempered (SSAND) jar, dated AD 600-850.

Phase 3

A single sherd of a SSAND jar (9g) was found in the embankment layer [153]. The vessel was sooted and therefore used as a cooking pot or utilised to heat water or another liquid.

Phase 5

The phase produced a total of three sherds of pottery representing 3 ENV and weighing 76g. The pottery was recovered from two deposits and the earliest layer [102] only produced sherds of chaff-tempered wares: CHAF and CHFS, the latter as a neck and shoulder from a jar. A later layer [100] produced a sherd of a SSAND jar.

Phases 2-3 and 5 only contained sherds of Middle Saxon chaff- and sand-tempered wares and this equates to the first ceramic phase of *Lundenwic* (Blackmore 2001, 40) and indicates activity in the late 7th century.

Phase 6

Compared to the previous phase, there is a small increase in the number of sherds found in Phase 6 (nine sherds/4 ENV/211g) although this was only recovered from one context: layer [97]. The pottery consists of two jars, one each in chaff-tempered ware (CHSF) and sand-tempered ware (SSANB). Both vessels have slightly everted rims, burnished surfaces and were used as cooking pots from the evidence of external sooting and internal food deposits. The other two vessels present in layer [97] are imported wares in the form of pitchers, firstly as a North French greyware example with an everted rim. Family sherds of this vessel have rouletted decoration and were found in later phased deposits [61] and [95]. The second pitcher is in an imported redware fabric (MSRW), dated AD 700-850 and survives as a strap

handle, made in a coarser material compared to the body. Other sherds of this vessel were found in later phased deposits [91], [93] and [95].

The combination of the chaff-tempered ware and MSRW fabrics indicates a deposition date of *c.* AD 700-750, although the absence of Ipswich ware in this phase may further indicate a spot date of *c.* AD 700-730.

Context	Phase	Size	SC	ENV	Weight (g)	Context ED	Context LD	Pottery types	Spot date
7	10	S	10	10	157	770	850	BEAV,CHSF, IPSC, IPSF, MSS, NFSVB, SSANB	770-850
10	10	S	6	4	114	730	850	CHAF, IPSC, IPSF	730-750
11	9	S	9	9	161	730	850	CHAF, IPSF, IPSM, SSAN	730-750/850
12	9	M	37	12	206	730	850	IPSC, IPSF, MSRWA, MSWW, SSANB	730-850
14	9	S	13	11	242	770	850	CHSF, ESUR, IPSF, IPSM, MSS	770-850
19	9	S	11	1	96	670	850	BADO, SSAND, SSANE	670-850
20	9	S	3	3	29	600	850	MSSW, SSAND	600-850
33	8	S	1	1	1	600	0	CHSF	600-750
35	7	S	3	2	28	0	0	NFGW, SSANB	600-750
36	9	S	8	6	85	770	850	IPSF, MISC MS, MSS	770-850
39	7	S	2	1	41	600	850	SSANA	600-850
61	9	S	6	4	31	600	750	CHAF, MISC MS, NFGW	600-750
64	7	S	2	2	344	600	850	AMPH, SSAND	600-850
67	7	S	1	1	2	600	850	NFGWA	600-850
89	9	S	5	5	109	770	850	AMPH, IPSC, MSS, SSANA	770-850
91	9	S	4	2	134	730	850	CHSF, IPSF, MSRW	730-750/850
93	9	S	1		8	600	850	MSRW	600-850
95	7	S	4	4	44	700	850	CHFS, MISC MS, MSRW, NFGW	700-750
96	7	S	3	3	42	600	750	CHFS, SSANB, SSAND	600-850
97	6	S	9	4	211	700	850	CHSF, MSRW, NFGW, SSANB	700-750
100	5	S	1	1	24	600	850	SSAND	600-850
102	5	S	2	2	52	600	750	CHAF, CHFS	600-750
153	3	S	1	1	9	600	850	SSAND	600-850
154	2	S	2	1	43	0	0	SSAND	600-850

Table 2. JAD14: distribution of pottery types showing the phase, the size/number of sherds (SC), ENV, weight in grams, the date range of the latest pottery type, the pottery types

present and a spot date (context considered date) for each context Post-Roman pottery occurs in.

Phase 7

The quantity of pottery increased in this phase (fifteen sherds/13 MNV/501g) compared to the previous one. In this period pottery was found in six contexts. The dump levelling layer [96] produced three sherds of pottery in fabrics CHFS, SSANB and SSAND and all in the form of jars with burnished or wiped surfaces. Sealing [96], the dump levelling layer [95] contained three sherds of pottery which included a miscellaneous greensand-tempered ware (MISC MS) and a sherd of MSRW previously recorded in Phase 6, layer [97], besides a sherd of a NFGW jar or pitcher, possibly with a biconical profile and decorated with a band of rouletting. Sealing [95], layer [39] produced two sherds from a thin walled SSANA jar. A later oyster shell midden [35] produced only three sherds of pottery and this consisted a sherd of a sooted SSANB jar and two sherds of a NFGW pitcher surviving only as a curved strap handle.

Only a sherd of North French greyware was recovered from layer [67], while a later layer [64] contained a sherd of residual Roman amphora (AMPH) and a nicely burnished sherd of a SSAND vessel.

The types of Middle Saxon pottery recovered in this phase indicate the same dating as that for Phase 6: early 8th century, although the absence of Ipswich ware may further refine the dating to *c.* AD 700-30.

Phase 8

Only a single sherd (1g) of a chaff-tempered ware (CHSF) was recovered from this phase and it was found in layer [33]. The sherd of pottery is broadly dated *c.* AD 450-750 in *Lundenwic*.

Phase 9

The largest quantity of pottery from the site was recovered from this phase and found as 97 sherds/52 ENV/1.101kg and this was excavated from ten contexts. One of the earliest features in this sequence was pit [21] and it contained in its fill [20] two sherds of sand-tempered ware (SSAND) and a sherd of imported whiteware (MSWW). Sealing the latter, layer [19] produced a total of eleven sherds of pottery, four sherds of which were in the SSAND fabric, besides a single sherd of SSANE. The six other sherds are from a single imported Badorf ware (BADO) vessel, dated AD 670-850.

The oyster shell midden [61] contained six sherds of pottery which consist of a single sherd of CHAF, an abraded sherd (MISC) and four sherds of North French grey ware, one of which has an internal purple deposit and the other three sherds are found as family sherds of the rouletted ?biconical pitcher, previously recorded in Phase 7, layer [97]. The combination of pottery types found in layer [61] indicates a deposition date of *c.* AD 600-750.

The possible pit [94] contained in its fill [93] a single sherd of the MSRW pitcher, family sherds of which were noted earlier in Phase 7, layer [95] and elsewhere in this phase.

A later ditch [15/92] contained in its fill a residual sherd of the MSRW pitcher, a sherd of a jar in CHSF and the first occurrence of Ipswich ware (IPSF). The latter ware is dated *c.* AD 730-850, although its occurrence in this deposit with a chaff-tempered ware indicates a possible *c.* AD 730-50 deposition date. A later fill of the ditch, [36] produced eight sherds of pottery, four of which were Ipswich ware (IPSF) and included a jar rim. Two other sherds were too abraded to identify their fabric type, while another is an oxidised imported ware (either MSRW or another Badorf ware). The latest pottery type recorded is the earliest occurrence of a sherd of shell-tempered ware (MSS), dated AD 770-850. A subsequent fill of the ditch, [14] produced thirteen sherds of pottery, nine of which consisted of Ipswich ware and mostly as the fineware (IPSF), which include the rim of a pitcher and the stamped and incised line decorated sherd. Amongst the two sherds of IPSM, one has possible burnished lattice decoration, possibly dated to the early 9th century. A residual sherd of chaff-tempered ware (CHSF) is noted, besides a jar rim in early Surrey ware, dated 1050-1150, which is presumed to be intrusive. Otherwise, the latest pottery present in fill [14] are two sherds of shell-tempered ware (MSS), dated AD 770-850. The latest fill [11] of the ditch produced nine sherds of pottery, seven of which consisted of Ipswich ware, most of which is recorded as IPSF and in the form of some three jars, although a possible bowl rim may also be present. A single sherd of an IPSM jar is additionally noted. Single sherds of a CHAF jar and a sand-tempered (SSAN) sherd also occurred in fill [11].

Truncating fill [11], pit [13/90] produced in one of its fills, [89], five sherds of pottery, which included a residual sherd of Roman amphora, as well as a sherd of Middle Saxon SSANA, an IPSC jar rim and two sherds of shell-tempered ware (MSS), one sherd of which was a jar shoulder. The latest fill of the pit, context [12] produced a total of 37 sherds of pottery, of which 33 sherds are as Ipswich ware, the majority being the fine fabric, while one sherd was coarse (IPSC). At least three rounded jar rims were recorded in the IPSF/C fabrics. A single, small sherd of SSANB is noted, while three sherds are imports and include a single sherd of redware (MSRW) as well as two sherds of miscellaneous white ware (MSWW).

The earliest stratified deposits in Phase 9, such as fill [20] of pit [21] and layer [19], have fairly broad dating Middle Saxon period pottery types. The earliest fill [91] of ditch [15/92] contained Ipswich ware as the latest pottery type present in *Lundenwic c.* AD 730-850 and this deposit may date to a third ceramic phase dated *c.* AD 730-770 (Blackmore 2001, 40) by the absence of shell-tempered wares. The occurrence of the latter define a ceramic phase dated *c.* AD 770-850 (Blackmore 2001, 40) and these wares first appear in the stratified sequence of fills [36] and [14] of ditch [15/92].

Phase 10

Two contexts produced pottery in this phase as a total of sixteen sherds/14 ENV/271g. Layer [10] produced six sherds of pottery, one of which was a chaff-tempered ware sherd, the rest of the material consisting of Ipswich fineware and included three jars. Truncating the latter, pit [9] contained in its second fill [7] ten sherds of pottery recorded as four sherds of Ipswich

ware (IPSF/C), which includes a jar rim, two sherds of shell-tempered ware (MSS), single sherds of CHSF and SSANB, besides two sherds of imported pottery, both dated AD 700-850. The first consists of a sherd of Beauvais-type whiteware (BEAV), although it has a possible red paint decoration, which would date it to the 9th century. The second imported sherd is a jar rim in N French/Seine Valley buffware (NFSVB) and it has external sooting and a possible internal food deposit.

The presence of shell-tempered wares indicate a *c.* AD 770-850 date for this phase, although the occurrence of the possible red painted BEAV sherd possibly infers an early 9th-century date and fits Blackmore's (2001, 40) *Lundenwic* ceramic phase dated *c.* AD 810-70.

Significance Of The Collection

The pottery has important significance at a local level. The assemblage follows that of the ceramic profile and phasing of that of other *Lundenwic* sites (Cowie and Blackmore 2012, 11-12). The pottery is most likely to have been derived from a source on site or in close proximity to the study area. While the main settlement area of Middle Saxon London (*Lundenwic*) is relatively well understood, the current understanding of its waterfront is minimal with only a handful of excavations providing scant evidence of its nature, while the potential for future archaeological work in this area will be at the best extremely rare events (Cowie and Blackmore 2012). Therefore, this small assemblage of Middle Saxon pottery will provide a very important insight into the nature of *Lundenwic's* waterfront and the character of the activities that took place there. The imported pottery, Ipswich ware and to a certain extent other non-local wares are more than likely to have entered the *Lundenwic* settlement from the area of the waterfront, i.e. the site represents a point of distribution. Therefore the assemblage is important for understanding if the pottery from a Middle Saxon *wic* waterfront site differs from that of the main settlement area, i.e. are there differences in the relative proportions of imported wares in the different areas of the *Lundenwic* settlement. Also, the Adelphi Building assemblage may allow for a comparison between assemblages at the waterfront areas of other Middle Saxon settlements/ Emporia, such as *Hamwic* and Ipswich, besides Continental *wics* such as *Quentonvic* and Dorestadt. Other large assemblages have been excavated elsewhere in *Lundenwic*, such as at the Royal Opera House (Blackmore 2003), while the assemblage of pottery recovered from other waterfront sites, such as at 18-20 York Buildings (Cowie 1992) and 13-14 Arundel Street (Proctor 2000) provide additional ceramic evidence.

Potential

The potential of the pottery is to date the features in which it was found and to provide a sequence for them and a number of vessels would merit illustration. The small, but important quantity of Middle Saxon pottery further supports Middle Saxon activity on the area and gives important insights into ceramic use on the waterfront and the subsequent development of the study area with an occupational land use.

Recommendations For Further Work

A pottery report is required for the publication of the site. Emphasis will be made on comparing the assemblage to the other pottery groups from *Lundenwic* and other English and Continental *wic* waterfront sites. It is recommended that seven vessels are illustrated and used to supplement the text. Time should also be made available to consult Lyn Blackmore (MOLA) on identification of some of the Middle Saxon pottery fabrics and additionally to visit LAARC to look at the archive of 18-20 York Buildings.

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APPENDIX 4: Loom Weight Assessment

Chris Jarrett

Introduction

A small quantity of Middle Saxon loom weights were recovered from the excavation (1 box). The loom weights are in a variable condition ranging from fragments to a near complete item, although the majority can be assigned to a type. Some of the items show evidence for abrasion, however it appears that most of the material was deposited soon after being broken or were discarded. The loom weights were quantified by fragment count, estimated number of vessels (ENV's) and weight. The loom weights were recorded in seven contexts as mostly single fragments representing individual items, except for context [10] which produced two fragments from different objects.

The assemblage comprises a total of nine fragments of loom weights, weighing 1.975kg, of which one fragment (343g) was unstratified. The study of loom weights excavated in *Lundenwic* has been refined over the last three decades and the fabrics and forms these items occur in follows that of the latest published work (Keilly with Blackmore 2012, 218-226). The material was classified by fabric type and form and the following measurements were taken: the diameter of the object, its height, radius (width of the fired clay), central hole diameter, number of fragments, weight and the percentage of the surviving circumference. This information was entered into an Excel spreadsheet and analysed in an ACCESS database. The loom weights are discussed by its shapes and distribution.

The loom weights

A provisional analysis suggests that all of the weights are in Fabric 1a, defined as a fine micaceous body containing some sand and flint (as mostly pebbles) with added organics (Blackmore 1988, 111 & table 13; Goffin 2003, 216; Riddler 2004, 20). This is the most common loom weight fabric type identified in *Lundenwic* (ibid).

The loom weights were classified into the following types listed below, although as these items were handmade, then they did not all fall conveniently into one of the three main shapes found in *Lundenwic*. However, the biconical or bun-shaped type, dated to the late 7th century and Late Saxon period (Keily and Blackmore 2013, 222) is absent from the assemblage.

Annular/intermediate (Early-Middle Saxon): one fragment, 1 ENV, 302g
Intermediate (Middle Saxon): seven fragments, 7 ENV, 1.541kg
Unidentified (Middle Saxon): one fragment, 1 ENV, 132g

Distribution

The loom weights occur in Phases 7 and 9-10 (See Table 1). No temporal changes can be detected in the stratigraphic sequence of the loom weights and the earliest occurrence of this class of find occurs in Phase 7, layer [39]. This item was too abraded to be classified to a type. It may represent an item from an offsite source and was part of dump material used in the advancement of the waterfront. Intermediate shaped loom weights occur in Phase 9 and 10. The two loom weights most closely ressembling the annular early type are present at the top of the sequence of Phase 9 and the latest fill [12] of pit [13] (present as SF3) and Phase 10, found as a finger tip decorated example (SF2) present in fill [8] of pit [9]. Either the 'annular' types represent residual items or they are contemporaneous objects with the indeterminate shapes, for which there is increasing evidence for both, even all three types occurring together in Middle Saxon deposits (Hurst 1959, 24; Blackmore 1988, 112; 2008, 196; Goffin 2003, 220; Riddler 2004, 19 & 22).

What is also noticeable about the distribution of the loom weights is that they are mostly all recovered from the latest phases of site activity: Phase 9; the disuse of buildings and the occurrence of cut features, besides Phase 10; street yard surfaces. They occur with domestic activity, yet are entirely absent from Phases 3-6 associated with the waterfront and this may be of significance.

Context no	Phase	ENV	Number of fragments	Weight (g)	Type(s)
8	10	1	1	439	Intermediate: type 2, almost annular (SF2)
10	10	2	2	193	Intermediate: type 1; D-sectioned (SF23) Intermediate; uncertain sub-type (SF36)
12	9	1	1	302	annular/intermediate type (SF3)
19	9	1	1	163	Intermediate: type 1; C-sectioned (SF4)
39	7	1	1	132	Unclassified (SF5)
42	9	1	1	166	Intermediate: type 3; tall D-sectioned (SF6)
89	9	1	1	237	Intermediate: type 3; tall D-sectioned (SF9)

Table 1. JAD14: Distribution and quantification of loom weight fragments.

Significance, potential and recommendations for further work

The loom weights are of significance as they occur on one of only two so far excavated *Lundenwic* waterfront sites. The weights would have been used to keep the warp threads of an upright loom taught (Malcolm *et al*. 2003, 85). However, the loom would have employed around forty weights and so the mostly single occurrence of loom weights, spread throughout the later stratigraphy, and indicates weaving in the vicinity of the site. Loom weights are ubiquitous on sites across *Lundenwic*, suggesting that weaving was taking place across

settlement, probably within households, rather than as a specialised industry. The absence of the loom weights in Phases 3-6 and associated with the waterfront may be of importance and possibly indicates that this type of item did not enter *Lundenwic via* the river or were traded items. It may further support evidence that the majority of the loom weights were made in *Lundenwic* and not imported. However, more excavations on the *Lundenwic* waterfront are required to demonstrate whether there is a pattern for the absence of loom weights there compared to that of the rest of the settlement.

The potential of the loom weights are to provide broad dating to the deposits they occurred in. The items here also has initial potential for demonstrating if a characteristic of the *Lundenwic* waterfront sites are comparatively absent of loom weights. Comparison of the distribution of loom weights on the other *Lundenwic* waterfront site located at 18-20 York Buildings (site code: YKB88: Cowie and Blackmore 2013, 315) may further support the formation of a premise that the absence of loom weights is a characteristic of the *Lundenwic* waterfront.
A publication is recommended on the loom weights from JAD14 and four loom weights merit illustration, A comparison of the assemblage to others in *Lundenwic* in terms of composition and size should be considered for the publication and research of the 18-20 York Buildings excavation should be undertaken in order to determine if loom weights are associated or not with the waterfront deposits.

Catalogue of loom weights

Annular/intermediate type (Early Saxon-Middle Saxon)

Context [12], SF3

Diameter (mm)	Height (mm)	Radius (mm)	Hole diam. (mm)	% Present	No. of frags.	Wt (g)	Comments
130	37	42	35	52%	1	302	C-sectioned, more of an annular shape than that of the intermediate type. The central hole is oval which sways the data in determining what specific type it is. Oxidised. Decoration: two opposed finger tip impressions.

Intermediate types (Middle Saxon)

Type 1, Rounded C- or D- sectioned with a radius greater than the diameter of the central hole.

Context [19], SF4

Diameter (mm)	Height (mm)	Radius (mm)	Hole diam. (mm)	% Present	No. of frags.	Wt (g)	Comments
140	49	55	40	16	1	163	C-section, uneven finish, oxidised surfaces.

Context [10], SF23

Diameter (mm)	Height (mm)	Radius (mm)	Hole diam. (mm)	% Present	No. of frags.	Wt (g)	Comments
110	46	45	40	25	1	142	D- Sectioned, reduced completely

Type 2, almost annular, with the diameter of the central hole approximately the same as the radius

Context [8], SF2

Diameter (mm)	Height (mm)	Radius (mm)	Hole diam. (mm)	% Present	No. of frags.	Wt (g)	Comments
130	45	45	42	50	1	439	Largely intact except for the edges on one half of the item are missing/abraded. Almost an annular type with a C-section. Central hole is polygonal and made with a five sided tool. The top has a ridge around the edge of the central hole and around this are fairly closely spaced rounded dimples/finger tip impressions. Oxidised.

Type 3, Tall, C- or D-sectioned, generally the height is greater than the radius and the diameter of the central hole is the same or less than the radius.

Unstratified, SF1

Diameter (mm)	Height (mm)	Radius (mm)	Hole diam. (mm)	% Present	No. of frags.	Wt (g)	Comments
115	58	43	40	45	1	343	D-sectioned. Diagonal groove/chord mark found on one edge. Oxidised.

Context [42], SF6

Diameter (mm)	Height (mm)	Radius (mm)	Hole diam. (mm)	% Present	No. of frags.	Wt (g)	Comments
130	59	34	40	17	1	166	Best fit to a D-sectioned type 3 loom weight. Large rounded pebble inclusion 15mm long. Oxidised hole, slightly abraded exterior.

Context [89], SF9

Diameter (mm)	Height (mm)	Radius (mm)	Hole diam. (mm)	% Present	No. of frags.	Wt (g)	Comments
115	50	41	30	41	1	237	D-sectioned. Irregular shape in plan. Buff coloured surfaces, large pebbles up to 20mm. Diagonal chord mark. The break and central hole are covered in a rust deposit.

General indeterminate type

Context [10], SF36

Diameter (mm)	Height (mm)	Radius (mm)	Hole diam. (mm)	% Present	No. of frags.	Wt (g)	Comments
100	31	28	30	13	1	51	C-sectioned. The central hole appears to be off-centre and therefore does not allow for the shaped to be specifically categorised as types 1-3. Oxidised.

Unclassified type

Context [39], SF5

Diameter (mm)	Height (mm)	Radius (mm)	Hole diam. (mm)	% Present	No. of frags.	Wt (g)	Comments
-	57	-	90	16	1	132	The exterior is too abraded to determine the diameter and type. Oxidised.

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APPENDIX 5: Building Material Assessment

Kevin Hayward

Introduction and Aims

Twelve crates of stone, brick and mortar were retained from the excavations at the Adelphi Building. This moderate sized assemblage (343 examples 320kg) was assessed in order to:

- Identify (under binocular microscope) the fabric and forms of the reused Roman building materials but also any evidence for medieval or post-medieval
- Identify the fabric of the unworked and worked Roman stone in order to determine what the material was made of and from where it was coming from.
- Reference should also be made to the access catalogues for the building material (JAD14cbm.mdb; JAD14stone.mdb; JAD14stoneSF.mdb)
- Made recommendations for further study.

Methodology

The application of a 1kg mason's hammer and sharp chisel to each example ensured that a small fresh fabric surface was exposed. The fabric was examined at x20 magnification using a long arm stereomicroscope or hand lens (Gowland x10) and compared with Pre-Construct Archaeology's stone and ceramic building material reference collection. The appropriate Museum of London building material fabric code is then allocated to each item.

Ceramic Building Material 189 examples 56.5kg

Apart from two post-medieval brick fragments, all of the ceramic building material is Roman in origin. The masonry foundation of a very large extant medieval or post-medieval building which was recorded from earlier excavation was truncated by the basement of the Adelphi Building.

At least some of the daub and the loom weight (see Appendix 4) is Saxon.

Roman 187 examples 55.3kg

Condition

Although this very large group of ceramic Roman roofing tile, brick, box flue tile is in the main fragmentary, reused and intermixed; there are notable clusters of much larger near complete Roman brick and walling fragments especially from the Phase 5 Middle Saxon Waterfront features, e.g. [100] and [101]. None of this material is in an abraded condition suggesting that it was deliberately brought in to the site by boat or comes from a substantial masonry

structure nearby, rather than any foreshore reworking. This even applies to the finds from the earliest Middle Saxon Phase 2 gravel foreshore [154] and waterfront 1 [153].

Given that some of the bricks and tile are burnt [97] it is possible that the material could have been deliberately brought in from salvage and subsequently used as Saxon oven-bases and hearths, a feature seen elsewhere in *Lundenwic* (Smith 2003) prior to final discard as reclamation material. There is evidence for fire debris in Phase 8 [34].

Fabrics

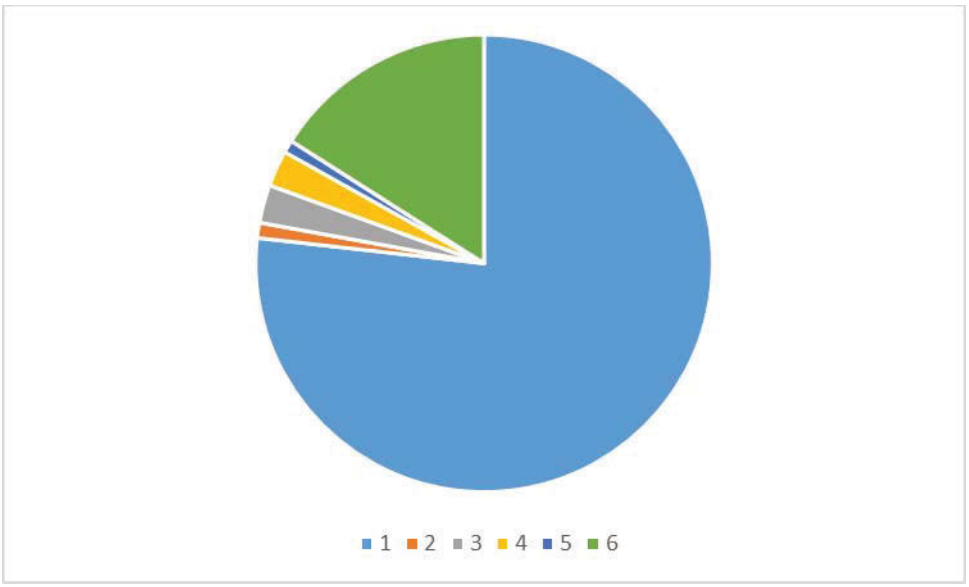

Figure 1. proportions of Roman fabric (by number of fragments) at JAD 14
1= Early London sandy group *2815* (AD 50-160)
2= Early Eccles *2454* (AD 50-80) and Radlett fabric 3023 (AD 50-120)
3= Silty/Hartfield Groups/Sussex fabrics (AD 60-140)
4= Late London sandy fabrics *2459b* (AD 120-250) and Reigate Fabric (AD 275-350)
5= Late Calcareous fabrics (AD 140-300)
6= Unidentified fabric *3500* probably a late Roman Calc fabric

Figure 1 shows the importance of Early London Sandy Fabrics >75% by weight (no.1) in the assemblage, but also rather late London fabrics (nos 4-6) of between 15 and 20%.

Early London Sandy Fabric Group *2815* (AD 55-160) 155 examples 42.7kg
2452; 2459a; 3004; 3006
By far the most common fabric both here and in Roman London are the early (AD 50-160) *2815* red group using local brickearth with coarse moulding sand. All the large *bessalis* and *pedalis* brick fragments including a fragment of walling from the Middle Saxon Phase 5

revetment features [98] – [102] are made of this fabric, suggesting derivation from a wall of a building.

The fabric is well represented in all types of ceramic building material.

Later London Sandy Fabric Group *2459b; 2459c* (AD 120-250*)* 10 examples 1.4kg
Later mica-dusted sandy fabrics with much finer moulding sand or chaff do turn up.

Eccles Sandy Fabric *2454; 3022* (AD 50-80) 4 examples 0.3kg
This very fine early cream-pink fabric manufactured around the area of the Eccles villa site in Kent during the mid-late 1st century.

Radlett Iron oxide Group early *3023* (AD 50-120) 2 examples 0.3kg
Roman ceramic building made from the very early Hertfordshire fabric group *3023* (AD 50-120) with frequent black iron oxide and small lumps of silt forms is only occasionally present in Roman tile from [64] and [73].

Silty Fabric *3028* (AD 60-120) 1 example <0.1kg
One fine banded tile fabric *3028* (AD 60-120) is the sum total of Wealden fabrics from the site.

Hartfield Fabric *3009* (AD 100-120) 1 examples 0.4 kg
The early Hampshire lumpy silty fabric 3009 (AD 100-120) forms a background component.

Calcareous Fabrics *2453; 3026* (AD 140-350) 2 examples 0.3kg
A *tegula* [98] and flat tile from [12] are characterised by late Roman shelly fabrics manufactured in coastal regions and brought into London during the 3rd and 4th centuries (Betts & Foot 1994).

Reigate Fabric *3014* (AD.275-350) 1 example 0.2kg
This busy late Roman Surrey fabric is represented by a brick from [12].

Unidentified Fabrics *3500* 12 example 8.9kg
A large group of cream-orange soft worn bricks, with a reduced core and numerous grey-green silty laminae and chunks could not be matched securely with any of the fabrics from the PCA reference collection. They resemble somewhat the cream calcareous fabric *3013* (AD 140-300) so may be yet another example of a late fabric. These were recorded in bricks mainly from the later Middle Saxon Phase 6 [97] and Phase 7 [95] [96] revetment and appear to represent a separate consignment of building material from the Phase 5 brick which is dominated by sandy fabrics. Further comparative analysis is essential.

Forms

Horizontal forms (brick; undiagnostic tile; box flue fragments) dominate (51.4kg 92.7%), with flanged and curved roofing elements very poorly represented (4.1kg 7.3%). This would either indicate selective acquisition of flat elements (which are also easier to transport) from stockpiles of Roman building material from the City or simply the dismantling of a large wall (e.g. defensive city wall which uses levelling courses of Roman brick and Kentish ragstone ashlar and rubble). Numerous examples of half or near complete *bessalis, lydion* and *pedalis*, many with large chunks of mortar still attached especially from [100] together with a fragment of sandwiched brick course walling and an enormous assemblage (198kg - probably the largest for Saxon London) of large Kentish ragstone blocks were recovered from the site.

Brick 89 examples 43.4kg

Two contexts from the Middle Saxon Phase 7 [64] and Phase 5 reclamations [100] have very large quantities of broken or near complete *bessalis, lydion* and *pedalis* often with large chunks of hard gravel mortar still adhered (Type 1). These are made from the common London sandy fabric group *2815*. By contrast those from the Phase 7 group [97] [96] [95] are dominated by the probable late silty calcareous group 3500. Indicating two quite separate dumping episodes represented by two different brick fabrics.

Tegulae 15 examples 4.1kg

Most of the flanged roofing tile is made from London sandy fabric *2815* with the large round flange profile 1 (up to 65mm high) typical of first-second century. The exception is an example of a late small late Roman rounded *tegula* profile 26 made from calcareous fabric *2453* (AD 140-300) from [98].

Imbrex 1 example <0.1kg

The solitary curved element from [7] would indicate that this building material was all coming from walled structures or that only the horizontal elements were being acquired from a stockpile of building material.

Box-Flue Tile and Brick 8 examples 1.7kg

A small but nevertheless varied assemblage of cavity walling was recorded from the Saxon layers. Of note is one clear roller stamped die and what appears to be a brick in fabric *3500* with a poorly defined roller stamped impression.

Type of Die	Context	Description	Fabric	Date
Roller Stamped Tile	Phase 10 Middle Saxon street surface [7] SF 44	Die 1 of Betts & Black (1997)	2452	AD 55-160
Roller Stamped Brick	Phase 6 Middle Saxon dump horizon [97]	Poor die imprint	3500 Probably 3054 or 3013	AD 70-400
Combed	Phase 9 Middle Saxon make up or surface layer [11]	Narrow comb slight curve	2452	AD 55-160
	Phase 9 Middle Saxon ditch fill [91]	Straight comb two faces wall jacketing	2452	AD 55-160
	Phase 9 Middle Saxon upper fill of ditch [14]	Chevron mould Narrow curved	2459a	AD 50-160
	Phase 3 Middle Saxon embankment near wattle structure [153]	Wide comb poorly defined	2452	AD 55-160

Table 1. Combed and roller stamped box flue tiles from the Adelphi Building

Flat Undiagnostic Tile 76 examples 6.3kg

Horizontal elements in the form of small fragments of tile are particularly common in the later Middle Saxon Phase 9 and Phase 10 levels [10] [12] [14].

The Fired Daub 22 examples 1.2kg

Worked daub moulded into sill like forms were identified from the latest Middle Saxon Phase 10 pits and street yard surfaces [7] [8] [10] with occasional examples present from Phase 7 [39] and earlier Phase 5 [98] [102] waterfront reclamation layers. They are fashioned from a grey-brown fabric with lumps of flint and polished quartz and bear some comparison with some of the Saxon daub recovered from other excavations in *Lundenwic* (Goffin 2003; Brown 2004; Smith 2012). Further visual analysis and comparison should be made.

Post-Medieval 2 examples 1.2kg

Brick *3033nr3034* (1664-1725)

3035 (1780-1940)

Part of a very thick (72mm) intermediate red brick fabric with small clinker inclusions *(3033nr 3034)* from the post-medieval Phase 11 brick surface [44] is most comparable with early post Great Fire bricks produced in the second half of the 17th to first half of the 18th century. This is exceptionally thick for a Tudor brick and it is also possible, given that the site lies out of the confines of the City of London, that it could represent a later 18th-century form. Red bricks continued to be made outside of the City after 1700 (K. Sabel pers. obs.). The brick has been further repointed in a T2 grey clinker shelly mortar (see Table 2) typical of late 18th to early 19th century.

A second example from a late post-medieval layer [2] in the yellow *3035* Medway fabric from [2] is at least Victorian in age and bonded in Roman type 4 cement patented only after 1800.

Mortar; Cement

A summary of the mortar types as well as their period of use from the excavations at JAD 14 are given below (Table 2). The T1 mortar, a hard flint gravel recipe is typically one used in Roman masonry construction and is present in an example of wall with two levelling courses of brick [100] and other large bricks. Secondary reuse in this fabric is present elsewhere in broken up bricks from [101] and [67].

Mortar/Concrete Type	Description	Use at JAD 14
T1 Hard Flint Gravel Walling Mortar	Hard flint gravel mortar Individual lumps of flint 40mm	Roman Primary mortar on the large *bessalis* and walled fragments especially [100] from Phase 5 Middle Saxon Waterfront 3 but also extensive reuse on other Phase 5 [101] and Phase 7 [67] bricks used in Middle Saxon reclamation
T2 Grey Clinker Mortar	Hard grey clinker mortar with shell fragments	Late 18th-19th century identified reused on 17th-18th-century brick from surface [44]
T3 *Opus Signinum*	White-pink concrete mortar large fragments of Roman cbm (20-30mm)	Roman Loose identified reused from a Middle Saxon Phase 10 stony surface [7]
T4 Roman Cement	Brown very hard fine calcareous hydraulic mortar	Late 19th-20th century Adhered to post-medieval machined yellow brick *3035* from [2]

Table 2. list of mortar types identified from the excavation JAD 14

Stone 131 examples 262kg

Ten rock-types were identified from the assemblage; their geological character, form and use are summarised below:

3105/3106 Kentish Ragstone/Hassock stone h*ard dark grey calcareous sandstone (Kent Ragstone); – Glaucontic sandstone (Hassock stone) - Hythe Beds. Lower Cretaceous (Lower Greensand) Maidstone area, North Downs* 101 examples 205kg

A very large assemblage of dumped large 3-12kg ashlar and rubble blocks of Kentish ragstone were found throughout the site but particularly from the Middle Saxon Phase 5 Waterfront 3 dumps [98] 18kg [100] 43kg and Phase 7 waterfront advancement and levelling [64] 38kg. Also present in a hone stone from [14].

3107 Malmstone *pale-cream low density glauconitic limestone Upper Greensand (Upper Cretaceous) Leatherhead – Farnham* 1 example 0.5kg

A fragment of building rubble was recovered from a sandy make up surface from Phase 9 [11]. This material has in the past been confused with Kentish Ragstone but comes from another part of the Weald altogether.

3109 Banded shelly oolitic limestone (Roman type) *Middle Jurassic (Bathonian) Southern edge of Cotswolds Bath-Oxford* 7 examples 8.7kg

Intermixed with the Ragstone are a sizeable group of broken up but nevertheless worked group of oolitic limestones all from the Cotswold region. These freestones, soft open textured limestones with an open porous texture, were the material of choice for sculpture, monumental architecture and funerary monuments in Roman London (Hayward in prep a). They turn up reused in Phase 10 Middle Saxon compact stony surfaces [7] [10] Middle Saxon Phase 7 [64] and [98] dump layer and Phase 3 waterfront 1 layer [153]. One possible source may have been from roadside funerary monuments or sarcophagi from immediately outside the confines of the Roman city wall.

3111 Brown Ferruginous sandstone "Carrstone" Tertiary London Basin 1 example 0.3kg

A partly worked, curved example of stone masonry, in this another rock type associated with construction rubble in Roman London was identified from a Middle Saxon Phase 9 upper ditch fill [14].

3118 Tufa *coarse textured light cream* c*alcite precipitation deposit, Holocene, Medway or Thames Valley* 2 examples 6.4kg

Examples of poorly worked ashlar made from this low density stone turn up just from the Phase 5 Middle Saxon revetment dumps [100] [101]. They may have derived from a bath-house structure or a public/private building requiring lots of low density vaulting.

3120 Sarsen – *fine white-grey crypocrystalline "sugary" sandstone. Palaeogene, Tertiary, Home Counties, e.g. Hertfordshire*

This was present in a small rectangular shaped sharpening stone with a smooth face from an organic layer [76] SF 47 from a Phase 6 revetment. Sarsen was used for this purpose elsewhere in Roman London, e.g. Drapers Gardens (Hayward in prep b) but it could conceivably be a Saxon portable object too.

3120 Gypsiferous Shale *grey mudstone with acicular gypsum crystals – Possibly Upper Jurassic (Kimmeridgian) or Purbeckian Isle of Purbeck/Kimmeridge Bay*

One unusual/rare rock-type for London were two examples of the grey burnt shale with large needle like acicular gypsum crystals. These were recovered in burnt nodules of stone from Phase 7 [95] and Phase 5 [99] Middle Saxon dump layers.

3120 Banded fine grained calcareous sandstone Possibly Wealden shale, e.g. Ardingly Sandstone, Lower Cretaceous (Wealden) Kent 1 example 0.1kg

From a Phase 9 fill [93] this fine grained sandstone hone resembles Ardingly Sandstone from the Weald, used in large quantity for this purpose throughout the southern half of the England during the Roman Period (Allen 2014).

3122 Septarian Nodule *Concretionary calcareous nodule within London Clay (Tertiary) London Basin* 1 example 1kg

Another building material associated with Roman London, this too was recovered from a sandy make up surface from Phase 9 [11].

3123R or 3123S German Lavastone *Hard dark –grey vesicular lavastone with white leucite crystals Tertiary Eifel Mountains (Andernach/Neidermendig Lavastone* 11 examples 1.9kg

Concentrating in the upper Phase 9 and 10 Middle Saxon layers [11] [12] SF 46 [14] [16], this hard volcanic rock had been worked into rotary quern (see Appendix 9 for report on their form). They were the quern material of choice for Saxon London, as shown by their frequent occurrence at sites throughout *Lundenwic* (Goffin & Williams 2003; Riddler 2004; Keilly 2012).

3130 Millstone Grit *Upper Carboniferous Derbyshire or South Wales. Medium-coarse grained angular quartz rich sandstone*

A second rock type used in quernstone from JAD14, millstone Grit has a hard, even, angular quartz surface ideal for the grinding of foodstuffs into coarse flour. It is identified in a Phase 9 pit fill [9] SF 45 This rock type has been identified elsewhere in Roman London, but it could conceivably be Saxon as well, and may have in the past been misidentified as Kent Ragstone.

Distribution

Structures in bold

Context	Fabric	Form	Size	Date range of material		Latest dated material		Spot date	Spot date with mortar
2	3035; 3101	Machine made London stock brick Roman cement T3	2	1780	1940	1780	1940	1850-1940	1890-1940
3	**3105**	**Kentish ragstone rubble *with flint and chalk recorded in situ***	**1**	**50**	**1600**	**50**	**1600**	**50-1600**	**No mortar**
4	2452	Roman bessalis fragment	1	55	160	55	160	55-160+	No mortar
5	2454; 3006	Eccles and sandy brick fragment	2	50	160	50	160	50-160+	No mortar
7	3105; 3109; 2452; 2459a; 2459b; 2459c; 2815; 3102; 3104	Kentish ragstone rubble Banded shelly oolitic limestone (Roman); Sandy tile, brick, imbrex box flue tile and roller stamped box flue tile, opus signinum T4 and moulded daub	20	1500 bc	1600	50	1600	300-1000	100-400+
8	3102; 3105	Moulded daub; Kentish ragstone rubble	4	1500 bc	1600	50	1600	600-1000	No mortar
10	3105; 3109; 2452; 2454; 2459c	Part worked Banded shelly oolitic limestone (Roman); Kentish ragstone; Roman tile, tegula and brick early and 1 late fabric tegula	22	50	1600	50	1600	120-400+	No mortar
11	3105; 3107; 3121; 3123R; 2452; 2459a	Kentish ragstone, Septarian nodule and Malmstone; German Lavastone quern; Early sandy tile, brick, box flue comb tegulae	18	50	1600	50	1600	50-400+	No mortar
12	3105; 3130; 3123R; 2452; 2459a; 2459c; 3500; 3022; 3026; 3028; 3006	Kentish ragstone, Millstone grit and German lavastone quern, early sandy, silty and sandy late Calc fabrics for brick tile and tegula	36	50	1600	50	1600	160-340+	No mortar
14	3120; 3123R; 3105; 3111; 2452; 2459a; 2459c; 3004; 3006	Wealden Whetstone and German lava quern; Ragstone and Carrstone mould; Roman early sandy brick, tile, combed box flue tile and late sandy tile	43	50	1600	50	160	140-400+	No mortar
16	2452; 3123R	Roman tile; quern	3	50	1600	50	1600	600-1000	No mortar

Context	Fabric	Form	Size	Date range of material		Latest dated material		Spot date	Spot date with mortar
		fragment German							
20	3102; 3105	Moulded daub big group; Kentish ragstone rubble	18	1500 bc	1600	50	1600	600-1000	No mortar
35	3105; 2452	Roman brick and Kentish ragstone	3	50	1600	50	1600	50-400+	No mortar
36	2454	Roman tile Eccles	1	50	80	50	80	50-80+	No mortar
39	3105; 2452; 3102	Kentish ragstone rubble; Roman tile and brick; fired clay	7	1500 bc	1600	50	1600	600-1000	No mortar
44	**3033nr3034; 3101**	**Large post-medieval transitional brick – reused in black T2 clinker mortar**	**2**	**1664**	**1800**	**1664**	**1800**	**1664-1800+**	**1750-1900**
64	3105; 3109; 2452; 3023	Very large group of Kentish ragstone rubble Banded shelly oolitic limestone (Roman) part worked; Roman sandy and Radlett tile and brick	13	50	1600	50	160	55-400+	No mortar
67	2452; 2459a; 3500; 3101	Sizeable group of Roman brick, tile and tegula reused T1 mortar	8	50	400	50	400	200-400+	100-400
75	2452; 3023; 3101; 3105	Early Roman sandy Radlett tile reused T1 mortar; Kentish ragstone rubble	4	50	1600	50	1600	55-400+	100-400
76	3120	Sarsen whetstone	1	50	1600	50	1600	50-400+	No mortar
89	3123R; 2452; 2459a; 3006	German Lavastone quern fragment; early Roman sandy tile and brick	16	50	1600	50	1600	55-400+	No mortar
91	2452; 3009; 3500; 3105	Fragments of early and late sandy and silty brick and combed box flue tile	15	50	1600	50	1600	100-1400+	No mortar
93	2452	Roman Tile	2	55	160	55	160	55-160+	No mortar
95	2452; 3500; 3006; 3105; 3120	1 or 2 sizeable bricks Large group of sandy but especially late silt fabric bricks; Kentish ragstone rubble and burnt gypsiferous mudstone	18	50	1600	50	1600	140-400+	No mortar
96	3105; 2452; 3500; 3101	Kentish ragstone rubble; Late T1 reused Roman brick and early sandy tegula	3	50	1600	50	1600	140-400+	100-400
97	3123R; 3105; 3106; 2452; 3500; 3101	German Lavastone rotary quern fragment; Hassock and Kentish ragstone	18	50	1600	50	1600	140-400+	100-400

Context	Fabric	Form	Size	Date range of material		Latest dated material		Spot date	Spot date with mortar
		rubble large group of early reused t1 sandy tegula and brick one half a bessalis size and late silty brick roller stamped brick							
98	3105; 3109; 3102; 2452; 2453; 2459c	Kentish ragstone rubble large group and part worked banded shelly oolitic limestone (Roman); moulded daub; Late Roman Calc tegula and early & late Roman brick	12	1500 bc	1600	50	1600	600-1000	No mortar
99	2452; 2815; 3500; 3105; 3120	Kentish ragstone rubble, Gypsiferous mudstone; Late silty Roman brick, early sandy tegula and tile	8	50	1600	50	1600	140-400+	No mortar
100	3105; 3106; 3118; 2452; 3054; 3500; 3101	Kentish ragstone rubble, Hassock stone rubble and Tufa part worked block; Very large group of nearly complete bessalis and pedalis, sandwiched fragment of wall with brick levelling courses T1 mortar	14	50	1600	50	1600	140-400+	100-400+
101	3105; 3118; 2452; 3101	Kentish ragstone rubble, Tufa ashlar; reused burnt bessalis brick T1 mortar	8	50	1600	50	1600	55-400+	100-400+
102	3105; 3102 2452; 3004;	Kent ragstone/ Hassock hone stone; daub burnt and fragment Roman tile Kentish ragstone rubble	5	1500 bc	1600	50	1600	55-400+	No mortar
153	2452; 3105; 3109	Underfired combed box flue tile; Kentish ragstone rubble and part worked banded shelly oolitic limestone (Roman) chisel marks	5	50	1600	50	1600	55-400+	No mortar
154	2452; 3105	Roman tile fragments and Kentish ragstone rubble	2	50	1600	50	1600	55-400+	No mortar

Recommendations/Potential

An assessment of the building materials (stone; ceramic building material; daub) from the Middle Saxon waterfront site at the Adelphi Building, shows how much Roman tile and brick

(50kg) and walling rubble (200kg) had been commandeered from salvage sites or defensive walls downstream and incorporated as revetment fill (along with consignments of timber) to consolidate the waterfront advancement of this part of the River Thames. The quantity of stone (ragstone walling but also some reworked Bath-stone funerary fragments and tufa vaulting) is possibly the largest to have been identified from a Middle Saxon excavation.

The size of the individual items of stone and brick (typically 3-12kg), to consolidate these fills, especially Phase 5 [100] would indicate procurement from a substantial wall like feature, such as the Riverside Defensive Wall. Some of the brick from an entirely separate consignment of building material [95]- [97] is made from an unusual calcareous silty fabric not comparable with any from the reference collection. One stone type a gypsifierous mudstone could also not be matched with any known London fabric.

The Saxon material is rather swamped by the Roman background but is characterised by the use of German Lavastone Quern, moulded daub and possibly quern made from Millstone Grit and hones. This is in keeping with existing studies.
Just one post-medieval brick structure [44] is probably 17th-18th century in date and so may not relate to the construction of Durham House.

In addition to a section examining the importance and possible origin of the large stone and Roman brick dump at publication certain aspects of the assemblage warrant further analysis

- Identify whether a large group of cream-orange soft worn bricks, with a reduced core and numerous grey-green silty laminae and chunks can be matched with the London MOLSS Fabric collection. They ressemble somewhat the late cream calcareous fabric *3013* (AD 140-300) but also earlier *3238* and *3054* fabrics.
- For the daub further visual fabric analysis and comparison should be made with existing studies of worked and burnt daub identified elsewhere in *Lundenwic* (Goffin 2003; Brown 2004; Smith 2012).
- Illustration of the Box flue roller stamp and possibly the roller stamped brick, whetstones and quernstones

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APPENDIX 6: Woodwork Assessment

Damian Goodburn

Introduction and terms of reference of this report

This report is intended to provide an assessment of the woodwork found during the excavation at the Adelphi Building. A few general points related to the early historic woodwork assessed here are included to orientate the reader. The site lies at the bottom of the relatively steep slope up to the well-known route of the Strand, which paradoxically lies above what would have been the early historic 'strand' or upper foreshore. Thus, it was expected that structures and deposits related to the development of the known early historic port town of *Lundenwic* would be found. It was also known from strictly limited archaeological excavations and watching briefs in the immediate area (such as at York Buildings, Cowie 1992) that the deposits would probably be waterlogged. This proved to be the case at the Adelphi Building where waterlogging preserved the woodwork assessed here. Here we are concerned with what was found in the 'Lift Pit Trench' excavation which was of modest size (*c.* 4.3m N-S and 3.5m E-W) and could only be excavated to a limited depth. Despite these provisos and the presence of deep modern foundations the location of the trench and systematic excavation and recording provided, important new information and an assemblage of Middle Saxon structural woodwork. However, it must be noted that it was not possible to fully excavate and record the lower parts of many of the vertical timbers found.

A summary of the general range of woodwork found and its function in brief

The latest woodwork found on the site consisted of a group of very decayed post-medieval foundation pile tips found at the north end of the trench. No later medieval woodwork was found and none of Roman or prehistoric date. The significant woodwork is all dated to the Middle Saxon period by closely associated finds of pottery and a coin. All the in situ structural remains were various forms of truncated riverside revetment, and a small number of isolated uprights. Here we have to keep in mind that some of the revetments may have functioned to retain 'barge bed platforms' close to the occupied waterfronts built to a higher level. This possibility may be clarified by further study.

The stratigraphically earliest revetment found lay towards the north end of the trench, orientated roughly E-W, and was a woven roundwood or 'wattlework' structure (Str [145],= Waterfront 1, see main report by D. Killock for more details). Progessing southward across the then tidal foreshore it was followed by three later, more robust revetments (W2, W3 and W4. These structures survived as lines of fairly close set, small round log piles (or pile holes). In many cases the piles had been removed or broken off in the Middle Saxon period and reduced by decay but it is clear that they must have once supported planking set on edge on their landward sides. These structures retained areas of in-filled made land which extended

the useable shore side ground and was eventually built on. They appear to be broadly similar to traces of such structures recorded at the York Buildings site just to the west. The land-fill dumps included much organic material including large amounts of cut roundwood used as makeup material due to the lack of suitable local stone. This slightly surprising practice from a modern point of view has also been found on many Late Saxon and Norman waterfront sites slightly down stream. Sub-samples of this material are essentially snap shots of little known local trees and woodland given appropriate study.

The revetments would also have made it easier for small and medium sized watercraft to come closer to the riverside land at high tide a useful feature in a developing port settlement. This would have improved access and eased unloading. The range of vessels used in the region at this time is not totally clear but seems to have varied from small dugout boats to larger planked 'ceols' (Keels) at the extremes. The ceols included a range of craft built using the clinker system where the shell of partially overlapping planking was fastened together with iron rivets ('rove nails'). Several iron rove nails were found on the site showing such craft were being broken up and or repaired close by. A third general type of vessel that visited the area would almost certainly have been Frisian trading vessels known, slightly later as 'hulcs'. These were large expanded dugout boats deepened and made more seaworthy with added overlapping planking, fragments of one have been found of 10th-century date downstream at Queenhithe, and more complete examples in the Netherlands. This brief discussion of craft used in river and maritime trade is closely linked to the finding of important items of portable woodwork in organic land-fill deposits on the site.

In the organic Middle Saxon land-fill deposits found on the site several small fragments of larger worked timber were found with some potential for providing tighter tree ring dating but the most important 'loose' woodwork examined off site proved to be two sections of imported, softwood stave built vessels. These were curved ends boards ('heading') of small barrels or tubs, more properly casks. They had traces of pine resin adhering and resembled small versions of elements from much earlier Roman casks used to transport resinated wine down the Rhine to the Low Countries and Britain. More work is required on these two timbers to check the species used etc (Fig. 1) but we can already note that they have shed some light on what must have been an important trade at the time. Such an international trade was previously virtually invisible at this period though fragments of similar imported casks are known from very late 9th to *c.* 11th-century contexts from the Late Saxon port area east of Queenhithe in the City. The cooperage fragments also shed light on variations in the methods, raw materials and tool kits used by coopers in western Europe at this time which are distinct, in some respects, from those of the earlier Roman and later, late medieval coopers.

Middle Saxon woodwork from SE England and the London hinterland; a small comparative archive

Whilst Roman and later medieval waterlogged woodwork found on historic waterfront areas of the City of London and Southwark are well known as key foci in London's archaeology, woodwork of Saxon date is much less well known. This is particularly true of woodwork of the Middle Saxon period of which relatively little has been found to date and even less investigated in detail. Principal exceptions include assemblages excavated at The Ebbsfleet tide mill complex of the AD 690s, and mill leat and well timbers found at the Barking Abbey site of similar and slightly later date (Goodburn 2011, 2013). Wessex Archaeology excavations in the vicinity of the Channelsea River in the Lea Valley have also produced important evidence of pile and plank revetments, wattlework and parts of a bridge or jetty but have not yet been published in detail. A small, rather ephemeral Middle Saxon wattlework structure has also been found at rather low OD levels further south in the Lea Valley by MOLA. A number of eroded fish trap structures have been surveyed and broadly dated to this period from the tidal Thames foreshore and estuarine tributaries in SE Essex but it has not been possible to investigate the woodwork of them in detail.

Finally, excavations and a watching brief carried out in difficult conditions at the York Buildings site just a little to the west of the Adelphi Building site produced evidence of both E-W pile and plank river wall revetments and similar N-S structures (Cowie 1992). These structures also retained organic, woody, land-fill dumps similar to those found at the Adelphi Building, i.e. they were partly 'crib work', box-like structures as well as timber river walls. Despite the difficult conditions it was possible to sample fragments of the oak retaining planking and obtain tree-ring dates of the AD 670s. The planking was made in the typical Saxon style by controlled splitting out of large logs ('cleaving') as saws were not used during the period. The retaining piles appear to have been made from small whole logs of oak and alder.

So in sum, it is clear that relatively little woodwork of this period has been investigated, recorded, closely dated and published to date indicating that even the modest assemblage from the Adelphi Building is of importance.

It is also true that relatively little is known about the range of woodland or more properly 'tree-land' (i.e, wildwood type high forest, managed woods, hedges, orchards, wood pasture etc) types during this period. Indeed it has been seen as part of the 'Dark Ages' of woodmanship by leading experts in the field. The treeland reconstruction work carried out for the Ebbsfleet mill complex and the Barking Abbey site have started to shed late on the variation in trees and woodland of the London hinterland at this period but there is little evidence gathered from west of the City to date.

Brief notes on what is known about tidal levels on the Thames during the Saxon period

The levels reached by the clearly tidal river Thames, which was still almost an estuary at this point, were clearly crucial constraints on the layout of the *Lundenwic* port and shoreside

occupation as well as the survival of the woodwork. The field of reconstructing the tidal regime at this period has been flagged up as a research priority (Butler 2014). Space does not permit a full discussion of this complex subject but it can summarised by noting that recent systematic archaeological work at the Ebbsfleet tide mill of the AD 690s and a re-examination of earlier recorded estuarine clay stratigraphy west of the present site shows that the tidal waters could reach as high as *c.* 1.6m OD and occasionally higher. This can be taken as an approximate, minimum, shore side occupation level for the Middle Saxon period of around 1.7m OD unless substantial 'mud walls' had been built to keep back the highest tidewater. In practice this level was suggested as likely for the lowest occupation levels at the Adelphi Building site and later confirmed as the level of a burnt building's floor (see main report). Given that the squashed condition of most of the horizontal roundwood in the lower organic land-fill deposits indicates some settling the original OD level for occupation would have been around +1.8m OD. That is the building's occupants were safely above the level of the vast majority of the higher sequence of high waters expected (ie regular larger high water 'spring tides', but probably below the occasional highest surge tides). It should be expected that the highest surviving woodwork would reach a somewhat lower levels as the original tops would not be totally waterlogged all the time so decay could take hold. The highest surviving revetment pile top appears to be timber [117] of Waterfront 4 reaching a +1.17m OD. These Middle Saxon levels show a rapid rise since *c.* AD 300 when shoreside occupation in the region reached as low as *c.* 0.0m OD. This means that the later Roman and early Saxon foreshore levels would be expected to be found substantially lower down than reached during this excavation.

Methodology

Excavation of the woodwork

The methodology used for the excavation was constrained by access and shoring concerns and the depth limitation discussed in the main assessment report. The main implication of this situation for this assessment of the woodwork found was that many of the upright elements could not be fully excavated, though a small sample were extracted whole at the end of the project by the site team. In most cases only the upper exposed parts of surviving revetment uprights could be removed by sawing off at the new formation level. Horizontal wattlework and some small stake tips could be excavated whole as could 'loose' timbers in the land-fill deposits.

A representative sub sample of the worked roundwood, and all the round log revetment pile tips and cooperage timbers were recorded in detail after cleaning in good light, mainly by scale drawing on gridded film. Pro-forma timber sheets were also filled in for the larger structural items and short annotated lists of bagged small material made during the scanning process.

An atypical approach to sampling the woodwork

All these lifted elements and samples were examined in detail, recorded and then sub-sampled off site by the author. All the slice samples of the uprights were retained for further analysis, unless repetitive within the same context and clearly of oak. Our two native oaks and their hybrids can normally be easily identified visually unless very immature or decayed.

Large samples of woody land-fill material and wattlework was also scanned and briefly listed (see below), with substantial sub samples retained for further dating or analysis if required post assessment.

Any material with over *c.* 45 annual rings and of oak was slice sampled for tree-ring study and possible dating, together with extensive slice sampling for species Id and conventional C14 dating. Unfortunately the number of possible or definitely viable tree-ring samples recovered is relatively small. After initial assessment by the tree-ring specialist the function to which samples may be put may vary.

Overall the procedures used are therefore broadly commensurate with the standards set out for such work in the English Heritage Guidelines on Waterlogged wood and the earlier Museum of London Archaeological site manual.

Quantification

It is not possible to list all the fragments of wood seen individually as they had been labelled and bagged on site and during environmental sampling in a variety of different ways but the following should provide an overview of the material examined.

A total of 61 bags of excavated wood were examined varying from, two almost complete individual pile timbers, to large bags of wattlework rods or loose items within deposits later labelled as finds. It should be noted that some of these bags were multiple sub-samples of the same deposit and most of these were discarded after opening and scanning the contents. Several of the bags once opened were found to contain only peaty material and weathered small roundwood fragments.

A total of 13 measured ‘timber drawings’ were made of representative worked items. And several detailed off site photographs were taken by PCA staff as an additional record – principally of the cooperage woodwork.

A total of only 4 possibly viable tree ring samples were taken Timbers [118], [120], [136] and oak plank fragment from context [97] <100>. A total of 10 samples were taken as possible C14 samples and several others retained as possible samples.

A total of 69 wood species Id samples were taken of clearly non-oak material probably also including some very young oak roundwood, this also includes 3 samples from the imported softwood cooperage. Some of the roundwood that was of oak was very unusually stained yellow, presumably due to peculiar local deposit chemistry?

Summary of key structural woodwork evidence recorded by provisional phase

This summary of the woodworking features of the main structures and key 'loose' woodwork found is organised here so as to be commensurate with the provisional phasing currently available and may need small revisions later. It is likely that all the uprights were either stakes or log piles rather than earth-fast 'posts' set in large holes but as most were not fully excavated we cannot be absolutely sure.

Large stake or pile found at a low level, Timber [158], Phase 2

This near vertical roundwood upright was only partially exposed in a small sondage next to the south end of the east section (See S5) of the trench but it may be the earliest structural evidence surviving on the site though its function and exact dating will remain uncertain.

Waterfront 1/ wattlework revetment Str [145], Phase 3

This structure had been much truncated in the Middle Saxon period by decay and trampling but it remained as an E-W alignment of substantial roundwood stakes with rods mostly *c.* 30-40mm diameter, wound round them in a plain weave. One interesting feature, paralleled in many other examples of Saxon period wattlework, was that the upright stakes were driven as adjacent pairs rather than singularly. They varied from *c.* 80-90mm in diameter. One of the obliquely cut rods ends [145] (a) was particular large at 55mm diameter and bore the marks of a straight edged blade over 75mm wide, which could have been either a billhook or axe. Though robust, such a wattle revetment would not have had a long life but would have been relatively cheap to make. The stakes were predominantly not of oak (see Appendix 7). The highest surviving levels reached *c.* +0.8m OD probably at least 0.6m lower than the adjacent dry land was likely to have been. With grey silt deposits overlying this structure it is perhaps possible that it was actually an eroded 'barge bed' revetment for beaching shallow draft vessels above the muddy foreshore (These are still in use on the Thames today). The base of the wattle rods was at *c.* 0.65m OD and the stakes were noted as having slumped towards the river probably due to earlier land-fill pressure. This structure may have been one of the very first built on the waterfront of Middle Saxon *Lundenwic*; a possibility to be explored in the analysis phase. The scale of the work was modest and the impression given is of a low cost private initiative rather than civic construction. A possible N-S return of this structure seen on-site was proved to be uncertain by further excavation close to the formation level limit.

Also in this phase was a deposit containing a spread of small roundwood, layer [153], a small part of the material appeared to have some woven elements and may thus have originally been wattlework laid horizontally as the base of an embankment or barge bed. Some obliquely cut ends of the small rods were visible, and recorded. This was one of several land-fill layers to contain much dumped roundwood probably of fairly local coppiced woodland origin.

Waterfront 2/ pile alignment Str [167] , Phase 4

This waterfront revetment survived as an E-W line of 6 circular voids where round log piles seem to have been pulled out. One round log pile Timber [132] partially survived in the east but could not be extracted. The diameter of the uprights was *c.* 110-140mm and they were set at a fairly regular spacing of 0.4-0.5m centres. This more robust structure must have retained planking set on edge to the north of the piles, as found near by at York Buildings. This structure had clearly been carefully dismantled, probably when the waterfront land was extended to the south.

Also phased with this revetment were three round upright voids ([144] etc) about 400mm to the south of Str [167] the function of these timbers is uncertain but use as mooring piles is a possibility. In comparative terms the materials and logistics involved in building this clearly higher and more solid revetment were more substantial than for W1 which might reflect an improved status in the owner of the frontage, or changes in its use.

Waterfront 3/ a line of cut down pile tips Str [168], Phase 5

This E-W revetment had clearly been largely dismantled with the uprights, which appear to have been small piles, either pulled out, or cut or broken off nearly flush with the foreshore (See main report). Six of the pile bases survived and sample sections were taken from the upper parts and pile [122] in the east was excavated almost whole from its point of truncation down. The majority of the round log piles were of oak or 'possibly oak', but the lifted example was of a less diagnostic species (apple/hawthorn see Appendix 7). The lifted pile [122] was *c.* 90mm in diameter and over 0.66m long with a smoothly hewn, square section, tip, whilst the top appeared broken and distorted. Atypically one of the piles, [118], was made from a 1/8th cleft section of oak from a small log. The top of this example was lifted and was *c.* 90mm wide and thick with full sapwood and was sampled for possible tree-ring dating, though it was clearly only just viable with *c.* 45 rings +. Oak log pile [120] from this revetment at 110mm diameter with moderately slow lateral growth and with full sapwood was also sampled for possible tree-ring dating (*c.* 50 rings, see Appendix 7).

Again the revetment piles were spaced at around 0.5m centres but less regularly aligned than in Waterfront 2, though it is likely that they still retained planking or possibly more irregular timbers, which in turn originally held back land-fill deposits.

A fresh coin of AD 655-675 was found in layer [100]/[101] above this demolished revetment. This find may suggest that the earlier revetments might reach back to at least as early as the mid 7th century (See main report).

A single isolated oak log upright, Timber [136] was found of this general phase at the north end of the trench. It was larger diameter than the revetment piles at *c.* 140mm, knotty and could not be fully excavated; however it appeared to have just enough rings for viable sampling for tree-ring dating. It could have fulfilled many functions, such as use as a mooring pile but the evidence is uncertain.

Organic land-fill deposits containing many small branches and possible coppice rods [98] and [99] were found dumped over the sandy foreshore deposits that lay over this revetment. The small roundwood in them was extensively sampled for species and age and contained many rods around 30-55mm diameter. Several with obliquely cut ends were found and a sub sample recorded. This material will have much potential to throw light on woodland management ('woodmanship' practices such as coppicing and pollarding) around *Lundenwic*.

***Waterfront 4 pile alignment Str [169*], Phase 6**

Again this revetment survived as a partially demolished structure where the implied retaining planking was apparently removed for reuse, but the piles themselves were left *in situ* with decayed tops. The round log piles were set on a roughly NE-SW line in the SE end of the trench where 6 lay inside the shored area. Again they were fairly regularly spaced at *c.* 0.4-0.5m centres. The lifted pile sections were clearly of young oak and varied in diameter from *c.* 90-130mm. The easternmost example Timber [117] was the most complete revetment pile lifted from the trench and survived just under 1m long without its very tip and was *c.* 105mm diameter. It had been cut from a fast grown, fairly knotty parent log and had a hewn pencil form point, with some partial axe marks surviving. This pile survived to a decayed top at *c.* 1.17m OD which implies a reasonably dry land surface adjacent of rather more, perhaps around 1.5m OD or more, though it is also possible that the owners of the plot were content to deal with high spring tide flooding for a few hours each month. Surprisingly on some small working quays (in boatyards etc) along the Thames estuary today minor high spring tide flooding is still accepted but not normally where dwellings are concerned. Organic dumped deposits containing degraded roundwood and oak chips, layer [75], were also found associated with this structure.

This revetment was sealed by organic land-fill dump layers including layers [97] and [96]. Sample bags retained from these deposits were mixed in composition some just being essentially peaty material and others containing weathered thin oak chips and fragments of roundwood together with other woodworking debris and portable artefacts outlined below and much domestic and food waste (See main report). The presence of oak chips clearly implies woodworking close by. These layers were deposited as land fill which would have lain behind

another later revetment advanced out into the Middle Saxon river, and was eventually built over. Dump layer [97] contained a weathered, radially cleft oak plank fragment without sapwood but with well over 50 tree-rings which was sampled for tree-ring dating Timber [97] <100>. The land-fill deposits also contained pottery dated to *c.* AD 700-750. Some of the portable woodwork found in these deposits was of particular interest and embodied key information related to international trade to *Lundenwic* and variations in Middle Saxon period cooperage across Europe, which are discussed below.

Summary description and initial discussion of two imported stave built vessel timbers (cooperage) samples of a hidden early historic trade (From land-fill layers [96] and [97], Phases 7 and 6)

Cask head piece [97] <40>

This timber was found in layer [97] and ran into the trench section where it was sawn off during lifting. However, the exposed end retained its curved, axe cut bevel showing that it had originally been an end board or 'head piece' from a stave built vessel (i.e. coopered container Fig. 1). The bevelled edge was cut to fit in the groove cut in the stave ends of the parent cask. This timber survived 0.39m long by 140mm wide and slightly compressed at 16mm thick. It had been trimmed from a radially cleft section of imported coniferous timber and resembles a smaller version of Roman cask ends made of silver fir or larch, both alpine conifers. Traces of axe marks survived on the bevelled end or 'basal' and also a bung hole 18mm in diameter. The preserved straight edge also contained a small edge peg to join it to another heading piece. One face of the head piece was partially covered with a yellow-brown resin deposits resembling that found on Roman coniferous cask timbers and some of Late-Saxon date found in London. This same face also bore traces of fine scratched marks, one was used to locate the edge peg hole but the other two appear to be a spectacle shape and a V. As these marks occur on the resin covered face which was used to seal the inside of the Roman casks, it is likely that these marks were made by the coopers or possibly timber suppliers, rather than vintners or 'customs officials' who would have marked the outside. The presence of the resin on one face and a bung hole indicates that the heading was clearly part of a cask rather than an open vessel.

More work remains to be done on this find and that briefly described below, such as species identification using microscopic techniques and detailed comparisons with other related material, but it is already clear that the material is particularly informative. This is almost certainly some of the very earliest evidence for a trade in central European wine to Saxon England yet recognised (see below). It is also clear that there were regional variations in cooperage methods at this time exemplified in this material which were distinct from those of the earlier Roman period coopers and those of later medieval and recent times. The light

construction may be related to the use of smaller vessels and also a practice of producing the casks for one use only, a 'one journey cask' (See Kilby 1971 for more general background on coopering).

Fig. 1: Cask fragments [97] <40> (bottom), [96] <42) (top)

Cask head piece [96] <42>

A similar but even slighter example of a cask heading timber of coniferous timber was found in a similar dump layer [96]. Although the fragile item had been broken in antiquity and in lifting, when washed and reassembled it could be seen that it also bore clear evidence of use as a cask head timber. Features such as an axe cut bevel, 25mm bung hole, and an edge peg were found together with scribe marks. It survived 0.32m long by 105mm wide and only *c.* 10mm thick and was from quite a small vessel. Another difference from the above example was that this head piece had been made by tangential cleaving from a much smaller, slightly knotty, coniferous log.

Two other small fragments of coniferous timber were also found that are likely to have had a similar origin particularly as one had adhering pine resin (in [96] <38> and [154] <46>).

Some provisional notes on the implied, little known international maritime trade evidence by the cask fragments

The timber type of these two pieces of coopers work and the two smaller fragments is visually very distinctive and clearly coniferous (imported 'softwood') which did not grow in England at this time. Together with the traces of pine resin this evidence strongly suggest that the timber was of Alpine origin, used in casks assembled and filled in the Rhineland and sealed with warm pine resin. These features replicate those of large casks of Roman date found in Roman London and along the Rhine. So it appears that they are evidence of the re-emergence of a Roman style trade in resonated Rhenish wine. At this period it seems most likely from historical and archaeological evidence that this trade was largely in the hands of Frisian merchants who had trading colonies in the relevant areas and are well known as traders to Middle and early Late Saxon London (McCusker 1966; Ellmers 1990). It is likely that this trade came in vessels of the Hulc type. Interestingly, recently, other evidence of a probably similar trade of Rhenish wine has also been found through tree-ring provenancing, from the Middle-Saxon port of Ipswich, on a joint Oxford Archaeology and PCA excavation (The Stoke Quay site, Goodburn 2014; Tyers 2014). In the latter case the cask was made of oak most likely from the Mainz area on the Rhine.

We could be at the start of a new area of study related to the formation of early medieval towns in NW Europe, the early wine trade. Provisionally we can now see the wealthier inhabitants of *Lundenwic* enjoying a distinctive, and extinct, Rhenish, retsina-type wine alongside the ale and mead we might expect, possibly consumed alongside oysters brought up the estuary in quantity as evidenced on the site!

Brief provisional notes on relevant small finds: a small bowl fragment and some iron boat or ship fastenings

The landfill layer [97] also produced other material relevant to this assessment including fragments of a small turned wooden bowl with three scratched identifying marks on the base [97] <39>. Specied Id and illustration is recommended as Middle Saxon turnery is rare.

Several ship or boat rivets of iron were also found including a large example SF <33> from layer [97] and a much smaller example from context [11] SF <29>. Such iron rivets or rove nails are also sometimes found in high status doors and coffins of Saxon date but here a nautical origin is most likely. They probably derive from the recycling of nautical timbers for fuel and are not evidence of boatbuilding nearby.

Decayed traces of a post-medieval timber pile foundation

At the north end of the trench six sub-rectangular, foundation pile voids were found ([48]-[51] etc) and they contained the remains of several conifer knot cores. The use of conifer structural timber clearly suggests a later post-medieval date.

Summary list of the various categories of timber and bagged woody material examined from this project off-site, in context number order

[25] <16> fragile charcoal sample, of charred Saxon building timber
[39] <20> bark fragments
[47] peaty wood frags form post-med pile void
[49] Post-med conifer knot in pile void
[51] sp id samp kept
[67] <32> small rolled wood frags and peat, one bone frag
[75] <34> peat, 1 oak chip and crushed roundwood (2nd) bag
[96] water abraded decayed wood frags
[96] <38> small roundwood frags and peat
[96] SF 42 softwood cask end
[96] <38> 1 bag rolled and broken oak chips, 2nd bag just peat
[97] SF 16 unworked twig
[97] SF 39 turned wooden bowl fragment
[97] <30> rolled weathered wood chips and peat
[97] <39> small bag peat and roundwood 3 bags
[97] <40> softwood cask end, imported
[97] <100> loose plank frag oak
[98] frag of roundwood
[98] <40> wattle 11 samples
[98] <40> (a) small cut roundwood end
[98] <41> wood frags / peat 2 bags
[99] <42> peat and very broken roundwood 2 bags
[99] <43> roundwood deposit 5 samples
[99] <43> (a) small cut roundwood
[100] <44> broken roundwood frags 3 bags
[115] roundwood upright oak
[116] roundwood upright oak
[117] roundwood upright oak
[118] cleft upright oak, dend samp
[119] roundwood upright oak
[120] roundwood upright oak, dendro samp
[121] roundwood upright oak
[122] roundwood upright non oak
[133] roundwood upright non oak
[134] roundwood upright non oak
[135] roundwood upright non oak
[136] roundwood upright oak

[145] wattle revetment rods 16 samples
[145] (a) small cut roundwood
[145] (b) small cut roundwood
[147] roundwood oak
[148] roundwood upright oak
[151] roundwood upright non oak
[153] wattle sample- sub sampled 17 samples
[153] wattle sample and peat, part retained
[153] <45> brushwood duplicate samples 4 large bags
[153] (a) Small cut roundwood
[154] <46> fine roundwood, some wood chips, 1 softwood, 5 samples
[155] roundwood stake oak?

The significance of the woodwork

Though a relatively small assemblage, the location of the site and its date range means that the woodwork evidence from the Adelphi Building is disproportionately important as it is so rare in the wider context of *Lundenwic* excavations where little woodwork has been found. Thus, it clearly has local and regional significance. As this early port town is well known as a 'Mart of many nations..' according to the venerable Bede, it also has importance beyond the region as demonstrated here by the imported cooperage finds indicating trading with the Rhineland.

The potential for further analysis

This small assemblage of woodwork also has clear potential for shedding much more light on the construction, appearance and use of the waterfront of *Lundenwic*. It also has the potential to shed light on the form and construction of wooden import containers in the form of casks which are little known at this period, and seemingly evidence of the early re-emergence of the northern limb of the European wine trade. This evidence can also be set beside that of the study of imported pottery found at the site.

Finally, the assemblage also has potential to shed light on the varied nature of the wooded hinterland of Middle-Saxon London long before Domesday. It is already clear that most of the material used on the site was produced from managed woodlands but further analysis will be needed to characterise them contrasting with evidence for the harvesting of high 'wildwood-type' forest at the same period.

Suggestions for further work- method statement

It is suggested that an updated, fully referenced text with *c.* 5 draft be produced. To finalise this would require some draftsperson time, and it would have to take place after the Sp Id and aging work and tree-ring analysis had been completed.

The analysis/publication draft would include subjects outline just above but also a brief comparison of the cooperage woodwork with slightly later finds from Bull Wharf ('Aethelred's Hithe') and contemporary Middle Saxon Ipswich and Southampton.

Acknowledgements

Compiling this specialist assessment summary would have been impossible without the careful work of the site team particularly D. Killock who also provided much information at the post excavation level as did J. Butler. The PCA finds staff also provided assistance during the off-site examination and recording. Any remaining errors are this writer's responsibility.

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APPENDIX 7: Dendrochronology Assessment

Ian Tyers

Six samples from oak timbers excavated from the Adelphi Building, London (sitecode JAD14, NGR *c.* TQ 3041 8059) were submitted for dendrochronological assessment and analysis, a further 57 samples were submitted for identification, 36 of which were 3 groups for age/size analysis. None of the oaks were successfully dated.

Methodology

The timbers were supplied as cross-sections. They were assessed for the wood type, the number of rings they contained, and whether their sequences of ring widths could be reliably resolved. For dendrochronological analysis samples usually need to be oak (*Quercus* spp.), to contain 50 or more annual rings, and the sequence needs to be free of aberrant anatomical features such as those caused by physical damage to the tree whilst it was still alive. Standard dendrochronological analysis methods (see e.g. English Heritage 1998) were applied to the suitable samples. The sequence of ring widths in these samples were revealed by preparing a surface equivalent to the original horizontal plane of the parent tree with a variety of bladed tools. The width of each successive annual growth ring was revealed by this preparation method. The complete sequence of the annual growth rings in these samples were then measured to an accuracy of 0.01mm using a micro-computer based travelling stage. The sequences of ring widths were then plotted onto semi-log graph paper to enable visual comparisons to be made between the sequences and reference data. In addition cross-correlation algorithms (e.g. Baillie & Pilcher 1973) were employed to search for positions where the ring sequences were highly correlated. Highly correlated positions were checked using the graphs and where these were satisfactory, these locations were used to identify the calendar dates of the measured series.

The *t*-values reported below were derived from the original CROS algorithm (Baillie & Pilcher 1973). A *t*-value of 3.5 or over is usually indicative of a good match, although this is with the proviso that high *t*-values at the same relative or absolute position needs to have been obtained from a range of independent sequences, and that these positions were supported by satisfactory visual matching.

The tree-ring analysis initially dates the rings present in the timber. The interpretation of these dates relies upon the nature of the final rings in the sequence. Oak timber contains 2 types of wood, heartwood and sapwood, the latter is on the outside of the tree and thus contains the most recent growth rings, this material is softer and is not always preserved under archaeological conditions. If the sample ends in the heartwood of the original tree, a *terminus post quem (tpq)* date for the felling of the tree is indicated by the date of the last ring plus the addition of the minimum expected number of sapwood rings which are missing. This *tpq* may be many decades prior to the actual date that a tree was felled, particularly where poor

preservation or other loss of outer heartwood has occurred. Where some of the outer sapwood or the heartwood/sapwood boundary survives on the sample, a date range for the felling of a tree can be calculated by using the maximum and minimum number of sapwood rings likely to have been present. For the oak material the sapwood estimates used are a minimum of 10 and maximum of 46 annual rings, where these figures indicate the 95% confidence limits of the range.

The wood type of the identification sample was determined by taking hand cut thin sections of the timber in three planes (radial, transverse and tangential sections). These sections were placed on glass slides and examined at between 40x and 1000x magnification. The comparison of these sections with permanent reference slides and reference keys such as Schweingruber (1978) and InsideWood (Wheeler 2011) enabled an identification to be made for the material. Archaeological samples may have degraded during their burial, or during their storage, this may lead to the loss of one of more critical features that prevent identifications being made. It should be noted that it is usually not possible to identify timbers to species level.

Results

The submitted dendrochronological material comprised 6 oak (*Quercus* spp.) samples. All of these samples contained suitable tree-ring sequences for measurement and analysis (Table 1), 4 of the samples retained sapwood and bark. It was notable that the material contained some unusually slow growing and distorted oaks. The identifications, and age/size data are in Tables 2-5.

Comparisons between the measured oak series identified no internal cross-matching within the assemblage. The individual series were not found to cross-match individually to either regional British series, other Continental tree-ring series, or to other undated sequences from excavated artefacts or material from London and elsewhere. They are therefore undated by this analysis. Whether this is a reflection of early trade links, early woodland management and settlement, the neglected state of the local woodland in this period, or some combination of these factors is currently unknown.

The wood identifications include native hardwoods, and imported softwoods. Alder, willow/polar type, and fruitwoods are common in all areas and periods, whilst fir, yew and holly are more unusual.

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Table 1. Six oak (*Quercus* spp.) samples from site JAD14. AGR average growth rate mm/year. Bw, winter felled, ?B possible bark, B too slow growing to determine felling season

Sample	Size (mm)	Rings	Sap	AGR	Date of measured sequence	Interpreted result
116	125 x 120	30	10+Bw	1.84	undated	-
118	70 x 70	52	-	1.30	undated	-
120	100 x 100	70	22+?B	0.93	undated	-
121	90 x 90	71	29+B	0.69	undated	-
132	125 x 105	43	-	2.52	undated	-
136	120 x 115	53	22+Bw	0.92	undated	-

Table 2. Details of the 21 identification samples from site JAD14.

Abies*; Abies alba*, Fir, import from central Europe
Alnus; *Alnus* spp., Alder, one of several species, usually *Alnus glutinosa*, native
Ilex; *Ilex aquifolium*, Holly, native
Picea/Larix; *Picea abies*/*Larix decidua*, Spruce/Larch, import from Europe
Pinus; *Pinus sylvestris* type, Scots pine, import from Europe or Scotland
Pomoideae; fruitwood indeterminate, crab apple, hawthorn, etc., native
Quercus; *Quercus* spp., Oak, one of 2 species, native
Salicaceae; willows and/or poplars indeterminate, native
Taxus; *Taxus baccata*, Yew, native

cf. Comparable to, condition too poor for some key microscopic feature, also juvenile material (as typically used in wattle) does not always exhibit diagnostic features.

Sample	Identification	English Name
51	cf. *Pinus*	pine (a knot)
96, 36	*Abies*	fir
96, 42	*Taxus*	yew
97, 40	*Abies*	fir
98	*Quercus*	oak
98, 40a	Salicaceae	willow/poplar
99, 43a	Salicaceae	willow/poplar
115	*Quercus*	oak
119	*Quercus*	oak
122	Pomoideae	apple/hawthorn
133	cf. *Ilex*	holly

134	cf. *Ilex*	holly
135	Pomoideae	apple/hawthorn
145a	*Alnus*	alder
145b	Salicaceae	willow/poplar
147	*Quercus*	oak
148	*Quercus*	oak
151	cf. *Ilex*	holly
153a	*Alnus*	alder
154, 46	*Pinus*	pine
155	*Quercus*	oak

Table 3. Group 99, 43 roundwood age/size records, JAD14. Key as for Table 2.

sub-sample	Identification	ring count	diameter (mm) very compressed
a	Salicaceae	8	20 x 20
b	Salicaceae	8	30 x 15 (half)
c	Salicaceae	9	30 x 12
d	Salicaceae	9	15 x 9
e	Salicaceae	10	34 x 17
f	Salicaceae	10	35 x 35

Table 4. Group 145 roundwood age/size records, JAD14. Key as for Table 2.

sub-sample	Identification	ring count	diameter (mm) some compression
a	Salicaceae	5	17 x 12
b	Salicaceae	5	25 x 15
c	Salicaceae	6	35 x 25
d	Salicaceae	7	28 x 20
e	Salicaceae	7	38 x 27
f	Salicaceae	7	42 x 29
g	Salicaceae	7	25 x 15
h	Salicaceae	8	25 x 14
i	Salicaceae	8	33 x 22
j	Salicaceae	8	35 x 24
k	Salicaceae	8	31 x 16
l	Salicaceae	10	22 x 15
m	*Ilex*	>15	45 x 30
n	*Ilex*	>20	45 x 32
o	*Ilex*	>20	45 x 35

Table 5. Group 153 roundwood age/size records, JAD14. Key as for Table 2.

sub-sample	Identification	ring count	diameter (mm) very compressed
a	*Alnus*	3	9 x 7
b	*Alnus*	4	16 x 10
c	Salicaceae	4	27 x 11
d	*Alnus*	5	31 x 22
e	*Alnus*	5	26 x 18
f	Salicaceae	5	28 x 12
g	Salicaceae	5	25 x 17

h	*Alnus*	6	20 x 15
i	*Alnus*	6	10 x 8
j	Salicaceae	7	33 x 20
k	*Alnus*	8	43 x 27
l	*Alnus*	8	32 x 13
m	Salicaceae	8	18 x 9
n	Salicaceae	9	35 x 18
o	*Alnus*	12	54 x 28

APPENDIX 8: Glass Assessment

Chris Jarrett

Introduction

The glass recovered from the archaeological investigation consists of eleven fragments, representing eight estimated number of vessels (ENV) and weighing 13g. The material dates entirely to the Middle Saxon period, although one or two items may be Roman in date. The condition of the material is good, although extremely fragmentary and no vessel forms could be confidently identified. Additionally, the majority of the material was recovered from environmental samples and often survives as extremely small fragments and these weighed less than 1g. The glass was recovered from five contexts.

The glass catalogue

All of the material probably represents vessel glass and was made of soda-lime-silica (natron) glass and was free-blown as far as it could be determined.

Vessel glass

Context [12]

Pale green tinted glass with occasional fine bubbles. Wall fragment curving towards the base, narrow diameter. One fragment, 1 ENV, 1g.
Pale aquamarine coloured glass with occasional fine bubbles. Very small, thin walled fragment. One fragment, 1 ENV, <1g.

Context [14]

Pale aquamarine coloured glass with occasional fine bubbles. Flat fragment with tooling marks on the interior surface, wall thickness: 2mm. One fragment, 1 ENV, 2g.

Context [20]

Pale blue tinted coloured glass with occasional fine bubbles. Very small, thin walled fragment, curving. One fragment, 1 ENV, <1g.

Context [35]

Aquamarine coloured glass, no bubbles. Basal fragment with a small 'dome', body sherds with a strap handle terminal which has been cut to form ten surviving ridges which continue, slightly fanned out on to the body. Four fragments, 1 ENV, 10g. Possible jug or pitcher.

Clear coloured glass, no bubbles. Small fragment, decorated with a square/diamond pattern containing a fainter square, around the larger square is a square border containing embossed lines forming a trellis (Fig. 1). One fragment, 1 ENV, <1g. Possibly Roman.

Context [61]

Pale blue tinted glass with occasional fine bubbles. Very small thin walled fragment. One fragment, 1 ENV, <1g.

Blue tinted glass with occasional fine bubbles. Small fragment, with a horizontal trail, forming a cordon with a flat top and a thin hollow behind the trail creates a 'banded' effect. One fragment, 1 ENV, <1g. Possible drinking form.

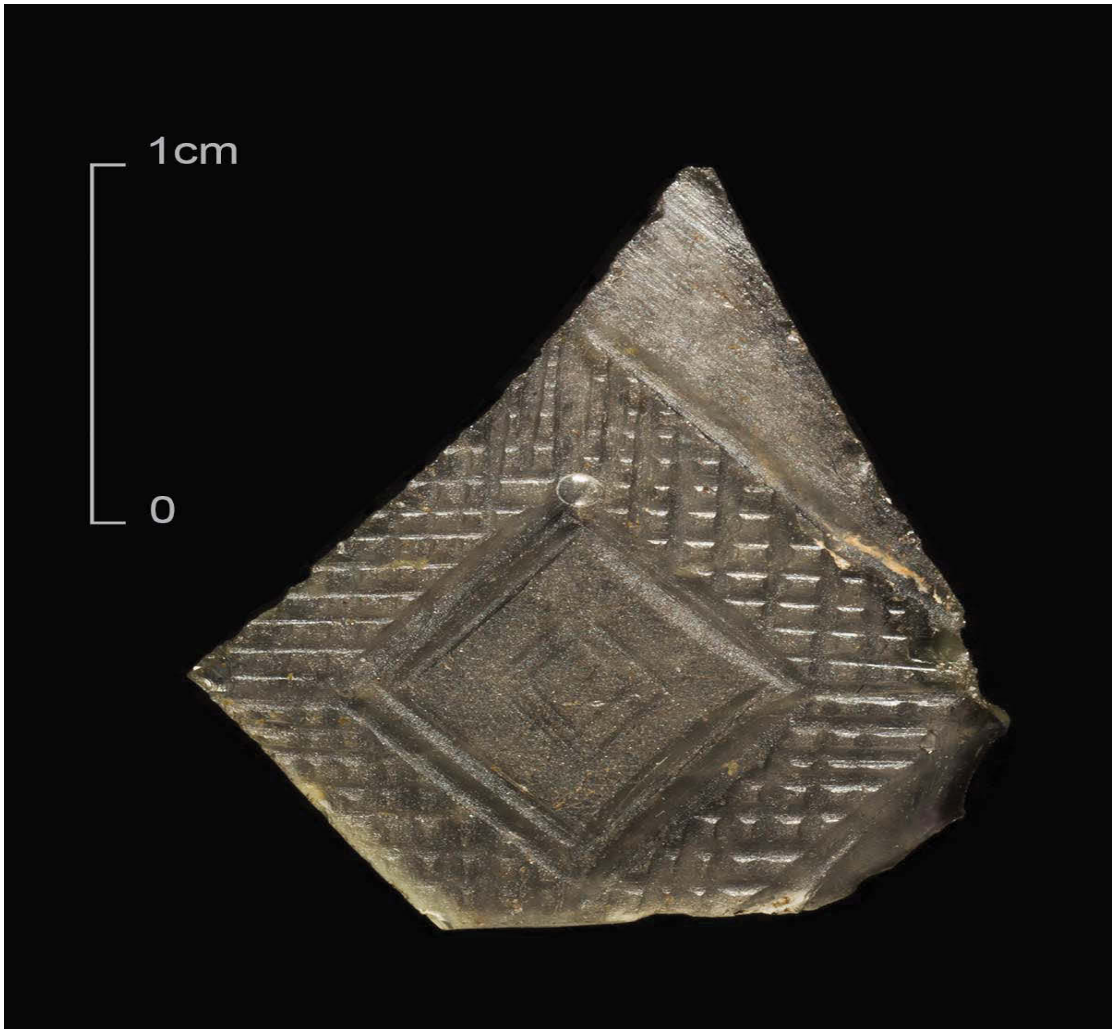

Fig. 1: Clear coloured glass [35] decorated with a square/diamond pattern

Significance, potential and recommendations for further work

The glass has some significance at a local level and further supports Middle Saxon activity on the site. Although the assemblage is in a very fragmentary state, the glass from context [35]. requires further research into the handled vessel and the small fragment with an embossed square/diamond design. The glass has the potential to demonstrate *Lundenwic's* contact with the Continent. A short publication report is recommended on the glass and two photographs of the vessel glass from context [35] should be used to supplement the text.

APPENDIX 9: Metal and Small Finds Assessment

Märit Gaimster

Introduction

Around 90 individual metal or small finds were retrieved from the excavation; they are listed in the table below. With the exception of one object (sf 50), the finds all came from Middle Saxon contexts and represent a range of characteristic artefact categories, including tools for textile manufacture, lava quernstone and bone- and antler-working waste. Waterfront-related finds are represented in net sinkers, or fishing weights, of rolled lead sheet and iron clench bolts that would have originated from boat structures. Highly significant is a Middle Saxon pale gold coin dateable to the later part of the 7th century. Metal and small finds were not retrieved from all phases, and were predominantly recovered from the later Phases 9 and 10 where they represent residual settlement material.

Phase 2

A handful of finds from the early foreshore or embankment comprise fragments of iron nails and a heavily corroded copper alloy Roman coin (sf 21) identified as a Constantinopolis issue dated AD 330-335.

Phase 5

Nine finds came from contexts associated with Waterfront Structure 3. While these include some fragmented and heavily corroded metal objects, there is also a probable iron boat clench nail or clench bolt (sf 43) and the fragment of a tapering hone or sharpening stone of Hassock sandstone (sf 30; see also Hayward, Appendix 5). A so-called pig-fibula pin provides a characteristic type object (sf 17*).* Utilising the naturally flattened distal end of this particular bone, pig-fibula pins occur in finds also from the Iron Age but are particularly common on sites from the Anglo-Saxon period (cf. MacGregor *et al.* 1999, 1950–51; Evans and Loveluck 2009, 40). Normally with perforated heads, as the Adelphi example, these pins may in fact have been a form of needle, used in looped needle knitting, so-called *nålebinding* (Tweedle 1986, 342-43), or as netting needles (Margeson 1993, 13).

Of particular interest is the finding of a Middle Saxon coin that can be dated to *c.* AD 650–675 (sf 18). The coin belongs to the series of pale gold coins that represent the tail-end of the first domestic Anglo-Saxon coinage. Starting out as imitations of Merovingian tremisses, coins were increasingly debased with silver, until a pure silver coinage, the so-called *sceattas*, appeared in the AD 680s. The Adelphi coin represents the most frequent type in the pale gold coin series; known as the ‘two emperor’ type, it imitates late 4th-century Roman gold coins that shows two enthroned emperors with a Victoria at the centre. The obverse, or front of the coin, shows the image of a Roman emperor with his pearl diadem and wearing a cuirass. Ocular analysis of the Adelphi coin suggest it may in fact be gilded over a core with very high

silver content; analysis of the metal content will be required to establish its gold content, and so a more precise date of the coin.

Phase 6

This phase, representing Waterfront Structure 4, produced seven finds. Representing a range of finds categories they include waterfront-related objects in the form of an iron clench bolt with lozenge-shaped rove (sf 33) and a net sinker of rolled lead sheet (sf 13). There are also two rectangular-section hones, of Wealden sandstone (sf 14) and Sarsen sandstone (sf 47). The latter hone type is known from Roman sites in London; it is possibly residual, but may also be of Saxon date (see Hayward Appendix 5). The curved edge fragment of a German lava rotary quern (sf 32) and a piece of antler-working waste (sf 81) both represent the earliest appearance on site of their individual finds category.

Phase 7

A complete double-ended bone pin beater (sf 12), an important weaving aid, represents textile working; the fragment of a ceramic loom weight was also retrieved from this phase (sf 5; see Jarrett Appendix 4). The remaining finds from Phase 7 contexts, however, were all in the form of antler-working waste (sf 70–74, 76, 79–80). The eight pieces represent tine ends, splinters and quarter-sections, possibly all different off-cuts, but also a thin rectangular pieces that is likely a blank or roughout for a comb tooth plate (sf 74). A longer rectangular piece, with both ends snapped off, has worked edges and remnants of a front surface with two ring-and-dot designs (sf 73); this may be a failed comb connecting plate.

Phase 9

The vast majority of finds came from Phase 9 with over 40 individual objects, amplifying the range of activities and finds categories seen in earlier phases. So this phase yielded nine pieces of antler-working waste of similar character to the material from Phase 7, including at least one likely roughout for a comb tooth plate (sf 38 and 69). There is also a fragment of finished comb connecting plate with remnants of drilled holes for metal rivets at either end (sf 62). A roughly worked rectangular piece, snapped off at one end, has a front surface with chamfered edges, all highly polished from wear (sf 7). New to this phase is also a quantity of bone-working waste of cattle long bones. Ten pieces include both cut-off ends (sf 66–67) and sawn sections of longitudinally split shafts (sf 58–59, 64, 67, 78). Assemblages of sections and cut-off ends of cattle metapodia are known from other Middle Saxon sites, for example 15–16 Bedford Street, to the north of the Adelphi Building (Riddler and Trzaska-Nartowski 2013, 84-5; cf. Cowie and Blackmore 2012, 168). Like the antler waste, the sawn cattle bone also relate to comb-making, with the long bone sections representing a first stage producing individual tooth plates. Among the finds from this phase is also an otherwise unworked sheep/goat foot bone that has been drilled through the proximal end (sf 57); the reason for this is not clear, but the object possibly represents an unfinished comb handle. A common

form in the 8th-century, handled combs utilising ovicaprid bone are known from *Lundenwic* and some other Middle Saxon urban settlements (Riddler and Trzaska-Nartowski 2013, 86 and fig. 5).

The second largest category of finds from Phase 9 are fragments of German lava quernstone, mostly curved edge pieces of upper or lower sections of rotary querns (sf 24–26, 46). Iron objects mostly consist of heavily corroded lumps, but there is a fragment of a probable iron knife (sf 28). As in Phase 6, waterfront-related objects are present in the form of a net sinker of rolled lead sheet (sf 10) and an iron clench bolt (sf 29). The clench bolt is complete with a lozenge-shaped rove. A heavily corroded small silver coin (sf 8) was identified as a Secondary Series K sceat Type 32a or b dated *c*. AD 710-760. A particularly interesting find is a small spindle whorl that may be made from walrus ivory (sf 39). The size and weight of individual spindle whorls would have had a practical function, relating to the fineness and quality of the yarn that was spun, with smaller whorl producing finer thread (Walton Rogers 2007, 26). The Adelphi Building spindle whorl is heavily polished from use, but the very small size may also suggest it was a child's object (cf. MacGregor *et al.* 1999, 1964).

Phase 10

The seventeen objects from Phase 10 are, again, dominated by bone- and antler-working waste of the same character as the previous Phase 9 finds (sf 51-56). There is also a fragment of end plate from a double-sided bone or antler comb (sf 35). At least two iron clench bolts were recovered, both incomplete (sf 48-49).

Phase 11

Two sawn segments of cattle metapodial, recovered from an early post-medieval context in Test Pit 2 may be residual here (sf 50).

Significance of the finds and recommendations for further work

The assemblage of metal and small finds from The Adelphi Building, a site on the waterfront of *Lundenwic*, provides an important contribution to our understanding of Middle Saxon London. Alongside well-established finds categories, such as bone- and antler-working waste, textile tools and lava quern stone, the presence of objects relating to boat structures and fishing are particularly interesting and will provide sources of further research. The Middle Saxon coin is highly significant for several reasons. It is the first representative of these early Saxon coinages to have an archaeological context; none of the few previously found gold or pale gold coins from London appear to have precise find spots. Secondly, the coin comes from the rarely explored part of *Lundenwic*, where it helps in providing dating for the site and the development of the waterfront here.

Publication is recommended for the finds assemblage in its entirety, with further research in particular of the bone- and antler-working waste and the iron clench bolts. Detailed studies of

the nail shank for shape and wood grain can be shown to be informative on boat construction as well as dating (cf. Brookes 2007, 9–11). For the purpose of publication and further analysis, the pale gold coin requires full identification and XRF analysis for metal content. All other metal objects (28 individual pieces) require x-raying.

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Phase	Context	Sf No	Material	Object	Description	Period	Pot Date	Further work
2	154	21	copper	coin	copper-alloy coin; Constantinopolis obverse helmeted head facing left, reverse victory on prow, diam. 10mm; dated AD 330-335	Roman	600-850	refine ident
2	154	22	iron	?nail	iron ?nail; narrow shaft only; W 2mm; L 25mm	Saxon	600-850	x-ray
2	154	bulk	iron	?nails	iron ?nails; three small pieces	Saxon	600-850	x-ray
5	100	34	iron	?fitting	iron ?fitting; heavily corroded; W 15mm; L 80mm	Saxon	600-850	further ident
5	101	17	bone	pin/needle	pig-fibula pin; complete with straight head and circular perforation; heavily polished from use; ?traces of wear to both lower and upper edge of perforation;L 93mm; perf. diam. 3mm	Saxon	n/a	further ident
5	101	18	gold	coin	pale gold coin; 'two emperors' type; Imperial bust in cuirass with pearl diadem//two enthroned emperors with Victoria at centre; possibly gilded over core of high silver content	Saxon	n/a	further ident and metal analysis
5	101	31	lead	waste	lead melting waste; irregular 5 x 20mm piece	Saxon	n/a	
5	102	19	copper	sheet/waste	copper-alloy sheet/waste; 20 x 25mm fragment only	Saxon	600-750	x-ray
5	102	20	iron	mount	iron mount; 10 x 10mm fragment only with hole for fixing	Saxon	600-750	x-ray
5	102	43	iron	nail	iron ?boat clench nail; incomplete; small circular head and slightly bent shaft; L 30mm+; head diam. 18mm	Saxon	600-750	x-ray and further ident
5	102	bulk	iron	?object	iron ?object; heavily corroded; W 20mm; L 50mm	Saxon	600-750	x-ray
5	102	30	stone	hone	hone of Hassock sandstone; tapering fragment only; one flat surface sunken from heavy use; one edge extant with diagonal parallel sharpening grooves; W 55mm; L 75mm+; th. 30mm	?Saxon	600-750	further ident
6	75	bulk	iron	?nail	iron ?nail; corroded lump only	Saxon	n/a	x-ray

6	76	47	stone	hone	substantial rectangular hone of Sarsen sandstone; end fragment only; W 65mm; th. 45mm	?Saxon	n/a	further ident
6	97	81	antler	waste	antler-working waste; irregularly split quarter of ?tine; sawn at both ends; outer surface polished from wear; L 60mm	Saxon	700-750	
6	97	33	iron	clench bolt	iron clench bolt; incomplete; 35 x 60mm lozenge-shaped rove; L 70mm	Saxon	700-750	x-ray
6	97	13	lead	net sinker	net sinker or fishing weight of rolled lead sheet; incomplete; diam. 20mm; L 35mm+	Saxon	700-750	
6	97	14	stone	hone	hone of Wealden sandstone; fragment only; surface with one sharpening groove present; W 30mm; L 50mm+; th. 15mm+	?Saxon	700-750	further ident
6	97	32	stone	quern	?curved edge fragment of German lava quernstone; both original grinding and outer surfaces present; 50 x 65mm; th. 50mm	Saxon	700-750	further ident
7	35	70	antler	waste	antler-working waste; tine end, roughly split/broken from beam, with two sawn surfaces; several cut marks present; L 85mm	Saxon	600-750	further ident
7	35	71	antler	waste	antler-working waste; triangular splinter only; L 38mm	Saxon	600-750	further ident
7	39	72	antler	waste	antler-working waste; sawn-off tine end only; L 67mm	Saxon	600-850	
7	39	73	antler	waste	antler-working waste; rectangular section/blank; back and sides worked; remnants of worked front surface to one end has two incised ring-and-dot decorations; both ends are snapped off; W 17mm; L60mm; th. 3-4mm	Saxon	600-850	further ident
7	39	74	antler	waste	antler-working waste; rectangular section/blank worked at all sides; badly drilled hole to one side; W 12mm; L 32mm; th. 1.5mm	Saxon	600-850	further ident
7	39	5	ceramic	loom weight	see Appendix 4	Saxon		

7	64	76	antler	waste	antler-working waste; irregularly quartered section of ?tine base; two cut surfaces; L 40mm	Saxon	600-850	further ident
7	95	79	antler	waste	antler-working waste; tine only; sawn at one end; L 95mm+	Saxon	700-750	further ident
7	95	80	antler	waste	antler-working waste;irregular splinter only; L 100mm	Saxon	700-750	
7	96	12	bone	pin beater	bone pin beater; complete double-ended of ?cattle metatarsal; L 73mm	Saxon	600-850	
9	11	60	antler	waste	antler-working waste; curved segment of tine; cut straight at one end and along two sides forming a point at the other end; L 52mm	Saxon	730-750/850	further ident
9	11	61	antler	waste	antler-working waste; roughly sawn/split tine end only; L 75mm	Saxon	730-750/850	
9	11	62	antler	comb	antler comb; fragment of connecting plate with remnants of drilled holes at either end; W 9mm; L 35mm+	Saxon	730-750/850	
9	11	57	bone	waste	?bone-working waste; sheep/goat foot bone drilled though proximal end; L 65mm	Saxon	730-750/850	
9	11	58	bone	waste	bone-working waste; section of cattle metatarsal sawn at both ends and split along sides; L 40mm	Saxon	730-750/850	
9	11	59	bone	waste	bone-working waste; section of cattle metatarsal, split longitudinally and sawn/split at both ends ; L 40mm	Saxon	730-750/850	further ident
9	11	28	iron	?knife	iron ?knife; tanged fragment only; W 20mm; L 55mm+	Saxon	730-750/850	x-ray
9	11	29	iron	clench bolt	iron clench bolt; complete with 30 x 50mm lozenge-shaped rove; L 35mm	Saxon	730-750/850	x-ray
9	11	24	stone	quern	German lava quernstone; four pieces; one with original grinding surface present; th. 35mm+	Saxon	730-750/850	further ident
9	12	63	antler	waste	antler-working waste; two sawn-off tine ends, one split longitudinally; L 40 and 45mm	Saxon	730-850	further ident

9	12	37	bone	?waste	?bone-working waste; 8 x 10mm fragment of surface only, with four roughly parallel incised lines	Saxon	730-850	further ident
9	12	64	bone	waste	bone-working waste; two sawn segments of cattle metatarsal, split longitudinally; L 40 and 55mm	Saxon	730-850	further ident
9	12	65	bone	waste	bone-working waste; cattle metatatarsal with proximal end still present; split roughly longitudinally; L 50mm	Saxon	730-850	further ident
9	12	66	bone	waste	bone-working waste;sawn-off end of cattle metacarpus	Saxon	730-850	further ident
9	12	3	ceramic	loom weight	see Appendix 4	Saxon		
9	12	bulk	iron	?objects	iron ?objects; four corroded pieces only	Saxon	730-850	x-ray
9	12	45	stone	quern	quern fragment of millstone grit; triangular ?edge piece with both original grinding and outer surfaces present; L 95mm; th. 30mm	?Saxon	730-850	further ident
9	12	46	stone	quern	edge fragment of German lava quernstone; both original grinding and outer surfaces present; 40 x 50mm; th. 55mm	Saxon	730-850	further ident
9	14	38	antler	waste	antler-working waste; rectangular blank/roughout; sawn on all sides; W 6/11mm; L 21mm; th. 3mm	Saxon	770-850	further ident
9	14	69	antler	waste	antler-working waste; trapezoidal blank/roughout; sawn on all sides; W 11mm; L 23mm; th. 2.5mm	Saxon	770-850	further ident
9	14	67	bone	waste	bone-working waste; two pieces of cattle metapodial; one cut-off end; one cut section, split longitudinally; L 52mm	Saxon	770-850	further ident
9	14	68	bone	waste	bone-working waste; section of cattle metatarsus; split longitudinally, sawn and roughly split at both ends; L 65mm	Saxon	770-850	further ident
9	14	bulk	iron	?objects	iron ?objects; four corroded pieces only	Saxon	770-850	x-ray

9	14	25	stone	quern	German lava quernstone; curved edge fragment of ?lower half; both original grinding and outer surfaces present; L 100mm; th. 50mm+	Saxon	770-850	further ident
9	16	26	stone	quern	curved edge fragment of German lava quernstone; pitting to edge and extant surface; L 11mm; ht. 40mm+	Saxon	n/a	further ident
9	19	4	ceramic	loom weight	see Appendix 4	Saxon		
9	36	39	?ivory	spindlewhorl	small plano-convex spindle whorl of ?walrus ivory; heavily polished from use; two cuts across flat base; diam. 20mm; ht. 6mm; wt. 3 g	Saxon	770-850	further ident
9	42	6	ceramic	loom weight	see Appendix 4	Saxon		
9	61	75	antler	waste	antler-working waste; snapped-off tin end only; L 68mm	Saxon	600-750	
9	89	7	antler	waste	antler-working waste; rectangular blank/roughout; sawn at one end, and snapped-off/unworked at the other; upper surface with broad chamfered edges and polish from wear; W 18mm; L 40mm+; th. 5mm	Saxon	770-850	further ident
9	89	77	antler	waste	antler-working waste; irregularly quartered section of tine base; sawn at both ends; L 60mm	Saxon	770-850	further ident
9	89	78	bone	waste	bone-working waste; section of cattle metatarsal; sawn at one end with cut marks at the other; roughly split longitudinally; L 60mm	Saxon	770-850	further ident
9	89	9	ceramic	loom weight	see Appendix 4	Saxon		
9	89	8	silver	coin	?silver coin; heavily corroded; diam. 19mm secondary series K sceat Type 32a or b dated *c.* AD 710-760	?Saxon	770-850	refine ident
9	89	bulk	iron	?objects	iron ?objects; three corroded pieces only	?Saxon	770-850	x-ray
9	89	27	stone	quern	curved edge fragment of German lava quernstone; both original grinding and outer surfaces present; L 115mm; th. 30mm	Saxon	770-850	further ident

9	91	10	lead	net sinker	net sinker or fishing weight of rolled lead sheet; diam. 10mm; L 25mm	Saxon	730-750/850	
9	93	bulk	iron	?nail	iron ?nail; incomplete; L 30mm+	Saxon	600-850	x-ray
10	7	52	antler	waste	antler-working waste; awn-off tine end; L 65mm	Saxon	770-850	
10	7	53	antler	waste	antler-working waste; wedge-shaped section of beam, sawn along sides; W 45mm	Saxon	770-850	
10	7	35	bone	comb	bone comb; double-sided; fragment of end plate only; ht. 40mm+	Saxon	770-850	
10	7	51	bone	waste	bone-working waste; two sawn-off ends of cattle metatarsal and cattle metacarpal	Saxon	770-850	further ident
10	7	48	iron	clench bolt	iron clench bolt; incomplete; 35 x 40mm ?oval rove; L 40mm+	Saxon	770-850	x-ray
10	7	bulk	iron	nails	iron nails; two pieces of shaft only; one bent/curved; L 50mm	Saxon	770-850	x-ray
10	8	2	ceramic	loom weight	see Appendix 4	Saxon	770-850	
10	10	54	antler	waste	antler-working waste; section of tine,sawn at both ends; L 24mm	Saxon	730-750	
10	10	55	bone	waste	bone-working waste; section of cattle metatarsal, sawn at both ends and sides; L 40mm	Saxon	730-750	further ident
10	10	56	bone	waste	bone-working waste;sawn-off end of cattle metatarsal	Saxon	730-750	
10	10	23	ceramic	loom weight	see Appendix 4	Saxon		
10	10	36	ceramic	loom weight	see Appendix 4	Saxon		
10	10	49	iron	clench bolt	iron clench bolt; incomplete; 30 x 35mm ?oval rove; L 40mm+	Saxon	730-750	x-ray
10	10	bulk	iron	?objects	iron ?objects; five corroded pieces only	Saxon	730-750	x-ray
11	4	50	bone	waste	bone-working waste; two pieces of cattle metapodial, sawn at both ends; one split longitudinally, the other split longitudinally twice into 1/4; L 43 and 45mm; from TP2	?early post-medieval	n/a	further ident
	0	1	ceramic	loom weight	see Appendix 4	Saxon		

APPENDIX 10: Animal Bone Assessment

Kevin Reilly

Introduction

This site was situated on John Adam Street, between the central part of the Strand and just north of Victoria Embankment Gardens. It revealed an extensive Middle Saxon stratigraphic sequence involving a series of waterfront structures, followed by levelling and the construction of a timber building showing the development of this part of *Lundenwic* sometime in the 8th century. This building was superseded by various cut features culminating in a probable yard or street surface. There is some evidence for later activity, possibly associated with Durham House, the former London residence of the Bishops of Durham. This building was constructed in the late 13th century surviving up to the 17th century. All of the animal bones, amounting to a substantial assemblage, were recovered from the Saxon levels with particular concentrations within dumps leading up to the development of the site and then in cut features following the demise of the timber building.

The hand collected assemblage was augmented by a large number of bones from the extensive sieving programme. A number of fish bones were recovered from the samples, which are described in a separate report (see Armitage).

Methodology

The bone was recorded to species/taxonomic category where possible and to size class in the case of unidentifiable bones such as ribs, fragments of longbone shaft and the majority of vertebra fragments. Recording follows the established techniques whereby details of the element, species, bone portion, state of fusion, wear of the dentition, anatomical measurements and taphonomic including natural and anthropogenic modifications to the bone were registered. All the samples were washed through a 1mm sieve and the resultant residues were hand sorted.

Description of faunal assemblage by phase

The site provided a phased hand-collected total of 4,336 bone fragments as well as 5,299 fragments from the sieved deposits. These were recovered from Phases 2 through to 10 (see Tables 1 and 2), which for ease of comparison in the following text have been divided into 4 main periods, here including phases: 2 to 6 – foreshore accumulation, the four waterfront structures and associated dumping; 7 – land raising above the waterfront structures; 8 and 9 – timber building and various cut features associated or post-dating its disuse; 10 – street and/or yard surfaces. There is a general dating continuum across these phases/periods with the earliest strata amongst the waterfront structure dumps, dating from the early 7th century, with 8th-century deposits then up the demise of the timber building followed by mid 8th to mid 9th-century levels. There is some overlap but essentially concerning those deposits with the

most bones, the earliest collections date to Phases 2 to 6, the middle dated section is within phases 7 and 8 and the latest in Phases 9 and 10.

The animal bones tended towards a moderate level of fragmentation, while a proportion of the bones in each phase showed some degree of surface damage. This was particularly prevalent in Phase 6 (about 20%) with most of the other collections with damage shown on 5 to 10% of the bones.

Phase	2	3	4	5	6	7	8	9	10
Species									
Cattle	23	25	13	191	402	311	2	216	96
Equid				1	1				4
Cattle-size	22	14	11	138	457	630	1	417	150
Sheep/Goat	2			15	48	79	6	118	34
Sheep				1	1	1		1	1
Pig	2	5		25	73	113	3	96	44
Sheep-size	7	1	1	27	104	121	1	116	34
Red deer						4		4	1
Roe deer									1
Dog								3	1
Cat								1	
Chicken				3	8	13		8	2
Goose					20	20		4	2
Goose-size								1	
Mallard					2				
Snipe								1	
Grand Total	56	45	25	401	1116	1292	13	986	370

Table 1. Hand collected species abundance by phase

Foreshore and waterfront structures (Phase 2 to 6)

The foreshore deposits predating the waterfront structures provided a cattle dominated collection, entirely take from sand and gravel layer [154]. The bone content within this presumably alluvial deposit is perhaps indicative of waste dumping within the tidal foreshore area. The identifiable bones include a wide range of parts suggestive of mixed processing and food waste.

This assemblage was overlain by a series of dumps associated with waterfront revetment structures 1, 2, 3 and 4, pertaining to Phases 3, 4, 5 and 6 respectively. The greater proportion of the bones in this extended collection was found in dumps [100] and [102] (272 fragments) in Phase 5 and [97] (972 fragments) in Phase 6. These followed the Phase 2 collections concerning cattle abundance (Table 1 and see Figure 1). While the smaller domesticate are far less numerous, it can be seen that pig is better represented than sheep/goat. There is also a similarity concerning skeletal part distribution, with one possible exception. A small collection of cattle skulls, one near complete as well the major part of a pig skull was found in dump [153] (Phase 3), these perhaps signifying processing waste. Notably the relatively complete cattle skull was undamaged in the frontal area, showing that a method

other than poleaxing had been used to slaughter this animal. These skull parts include two cattle horncores, a possible pair, these chopped from the skull using a series of cuts parallel to the nuchal (posterior) ridge. Removal of the horns probably denotes their redistribution, although not in this case, to local hornworkers. Notably, however, cattle horncores are particularly underrepresented amongst the Saxon collections, perhaps showing that they were generally removed to such craft facilities. This was demonstrated, for example, by the concentration of horncores found in a pit at the Royal Opera House (Malcolm and Bowsher 2003, 184). As well as these major domesticates, the later phases provided moderate quantities of poultry (mainly goose bones) as well as two equid bones. The previously described domesticate abundance pattern and the presence of poultry associated with the later waterfront features are also shown amongst the sieved collections (see Table 2). The two equid pieces include a metapodial from [100] Phase 5 and a loose mandibular tooth from [97] Phase 6.

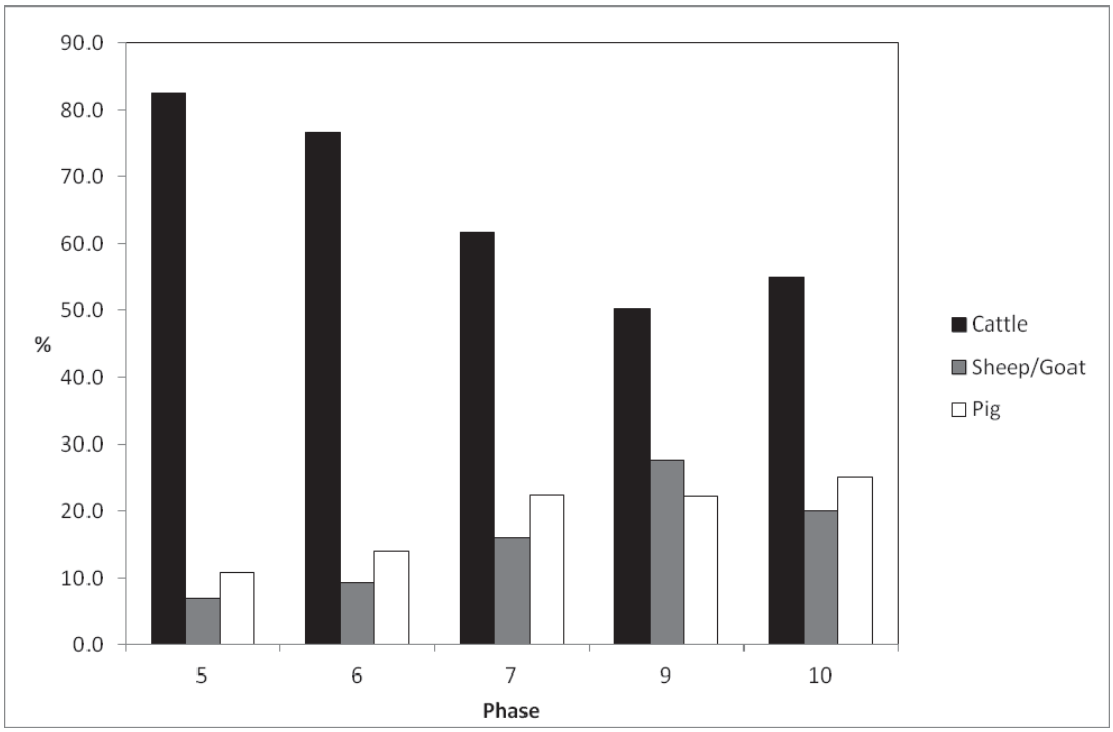

Figure 1. Percentage abundance of major domesticates within the larger phase collections (data taken from Table 1).

Land raising deposits (Phase 7)

Dump/levelling horizons overlying the waterfront structures and below the timber building provided a substantial collection. The greatest contributions were made by lowest and uppermost levels, namely [95] and [96] with 360 and 287 bones and then 354 bones from a broad dump largely composed of oyster shells [35] respectively. All follow the species and skeletal part abundance patterns set by the previous assemblages with a continuing small component of poultry bones. There is, however, a subtle increase in the proportion of both pig and sheep/goat at the expense of cattle (see Figures 1 and 2). The few red deer fragments

are antler pieces and no doubt represent waste from nearby antler workshops. This phase provided the earliest occurrence of fish bones (see Table 2 and Armitage) as well as part of a claw of a lobster or large crab, the latter taken from the oyster midden [35].

Phase	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Species									
Cattle	6	1		42	23	113	15	132	41
Cattle-size	35	7		34	41	705	90	670	134
Sheep/Goat		3		3	2	54	15	88	30
Goat								1	
Pig	4	1		1	6	111	30	122	39
Sheep-size	25			35	17	739	160	1180	385
Red deer					1	2		4	2
Dog								1	1
Whale								1	
House mouse						2			1
Chicken				2	1	12	2	8	3
Chicken-size						5	2	2	1
Goose					1	10		5	3
Goose-size					1	4		3	
Mallard						1			
Amphibian								3	
Fish						15		50	10
Crustacean						1			
Total	**70**	**12**	**0**	**117**	**93**	**1773**	**314**	**2270**	**650**

Table 2. Sieved species abundance by phase

Timber building and cut features (Phases 8 and 9)

There were just 13 bones dating to period of use of the timber building, these arising from [33], an external surface associated with timber beams [25]. This small collection was entirely composed of major domesticates. A much larger assemblage was derived from Phase 9 deposits, these principally derived from cut features, especially from ditches [14] (215 bones) and [92] (246 bones) and pits [13] (144 bones) and [90] (143 bones). There was also a notable collection from a number of possible surface layers and in particular from [11] with 134 bones. All of these features are within the latest Middle Saxon period mentioned above, i.e. dating between the mid 8th and mid 9th centuries.

In Phase 9 the major domesticate collection now shows a further decline in cattle, clearly at the expense of sheep/goat which for the first time is more numerous than pig (Figure 1). A similar decrease in cattle with a subsequent increase in abundance of the smaller domesticates is also shown by the sieved collection, although here there is still a greater proportion of pig (see Table 2). This change is not accompanied by any difference in the general make-up of these food dumps, again composed of a general mix of domesticate skeletal parts. Certain parts are, however, still under represented, such as cattle horncores. Yet there are still some working waste items in these collections, no doubt showing that this area was also used to dump some waste from the various workshops operating in this

settlement. These include another small quantity of red deer antler waste, plus a single large male goat horncore, derived from the contents of another oyster shell midden [61], this presumably representing hornworking waste.

The major domesticate part of the diet was again supplemented by some poultry and fish. In addition there was a single game species, snipe, as well as a single caudal vertebra of a small cetacean, probably common porpoise. Game species occur irregularly at *Lundenwic* sites with a notable bias towards wading birds, as woodcock (see Cowie and Blackmore 2012, 141). Cetaceans are somewhat rarer, with examples from just two other sites, including 55-57 Drury Lane which provided two skull pieces and a vertebra from a single mid 8th to mid 9th-century deposit, possibly taken from a single individual (ibid, 142) and a vertebra from an 8th-century deposit at the Royal Opera House (Malcolm and Bowser 2003, 87). Unlike the cetacean from this site, however, these other examples are clearly from larger species, similar in size to longfin pilot whales.

Street/yard surfaces (Phase 10)

The animal bone assemblage was taken from just three deposits, going from the lowest to the highest these include a compact surface horizon [10] (119 bones), the fill of pit [9] (45 bones) and another surface [7] (206 bones). The domesticate pattern here demonstrates an increase in cattle at the expense of sheep/goat, with pig returned to its level of dominance over sheep/goat. Changes to the Phase 9 pattern could relate to the relative size of the respective collections where generally the larger the quantity of bones, the more trustworthy the results. In combination, the two late Middle Saxon assemblages provide evidence for a subtle change in domesticate usage, this developing from the earlier (7th to mid 8th century) collections, as shown in Figure 2.

There is again no obvious evidence for concentrations of either food waste or butchers' waste (head and foot parts) but again with some deposition of craft waste (red deer worked antler). The meat diet feature some poultry, fish and, most unusually, some evidence (a roe deer tibia) of venison consumption. As previously mentioned, the deer remains are inevitably antler fragments, signifying craft rather than food waste, a pattern which is seen throughout *Lundenwic* (Cowie and Blackmore 2012, 141).

The non-food species include some dog bones (also found in Phase 9 accompanied by some cat fragments) as well as the largest collection, at this site, of equid bones. These include three foot bones and a sacrum, all found in surface deposit [7] and conceivably part of the same adult individual.

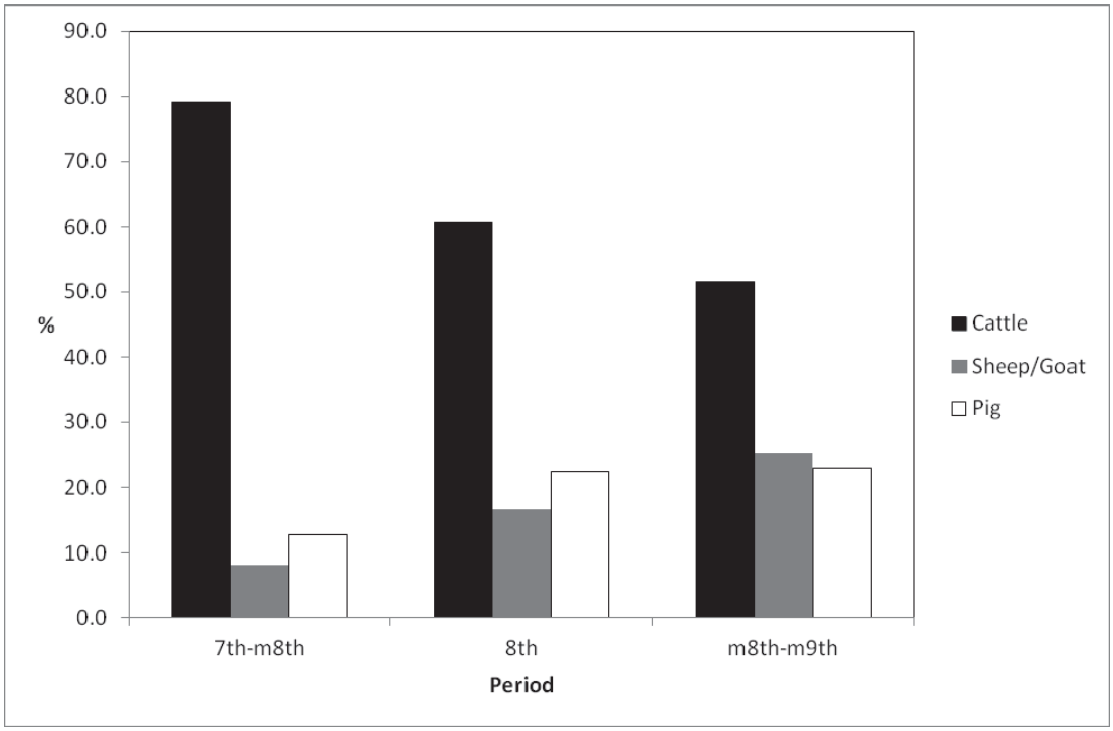

Figure 2. Percentage abundance of major domesticates within the three main Saxon periods, given in centuries AD, where 7th-mid 8th includes phases 2 to 6; 8th with Phases 7 and 8; and mid 8th to mid 9th with Phases 9 and 10 (data taken from Table 1).

Conclusion and recommendations for further work

This site has provided a remarkable sequence dating from the 7th through to the mid 9th century, the large quantity of well preserved bones arising from the individual phases and/or the combined 'periods' allowing for a thorough review of animal usage throughout the Middle Saxon occupation of this part of *Lundenwic*. Any further study will have the advantage of being able to rely on notable quantities of sieved as well as hand collected bones, both providing sufficient age and size data to demonstrate any changes in domesticate exploitation practises. Of particular interest is the described change from total cattle dominance to a greater usage of the smaller domesticates by the later Middle Saxon era. This undoubtedly follows a pattern shown at other well dated *Lundenwic* sites, perhaps related, regarding the sheep component, to an increase in wool production. The age information will obviously be of paramount importance in order to fully develop this conclusion (see Cowie and Blackmore 2012, 149-150).

The area formerly containing the Middle Saxon settlement of *Lundenwic* has been extensively excavated, with several sites providing large collections of animal bones (see Cowie *et al.* 2012, 149-152 and 312-327). A number of sites were excavated within the riverside part of this settlement (ibid), all notably within the south-western area close to the Adelphi Building, however, only the latter site provided a collection of a suitable size for detailed research. This obviously highlights the potential value of the Adelphi Building assemblage regarding any spatial element of animal usage in the settlement. However, in this it should be pointed out

that the waterfront collections are likely to represent the build-up of domestic waste from various parts of the settlement; while the later dumps, following the development of this area, are perhaps more likely to be locally derived.

There is the usual paucity of other food species found throughout *Lundenwic*, with poultry and fish supplying a supplementary part of the diet. It has been suggested that this relatively mundane aspect of their meat diet is related to the manner of food supply to this conurbation, principally by redistribution of food rents (O'Connor 2001). Arguments have been raised concerning a possible relaxation of this method of supply towards the beginnings of a medieval style exchange system by the 8th/9th centuries (see Cowie and Blackmore 2012, 149-152) and it is hoped that information from this site will further highlight these changes.
It should also be pointed out that some slight modifications to the later diet are already visible, including the possible consumption of venison and also of whale meat – as represented by the possible porpoise. The latter species, or indeed whales in general, are notably rare in *Lundenwic*, as previously mentioned, this bone represents just one of five cetacean fragments found at *Lundenwic* sites. It is conceivable that these may represent exploited beachings, although a local hunt of a small whale entering the Thames cannot be discounted. There is perhaps insufficient evidence to suggest whether a cetacean fishery was established in the Thames during this era, although porpoises were undoubtedly being hunted along certain parts of the French coast during this era (Gardiner 1997, 173-4), while a fishery exploiting Bottlenose dolphins was in operation in the Humber estuary from the 7th through to the 11th centuries (Dobney *et al.* 2007, 199-207).

This assemblage clearly deserves a detailed examination owing to its good state of preservation, its size and also the exemplary methods of recovery employed in its production. Of particular importance will be a study of the aforementioned change in domestic usage, which will involve the analysis of domestic abundance, the size of the collection allowing for the use of a weighted method (as Epiphyses Only, following Grant 1984) in combination with the usual fragment counts; as well as an analysis of the age and sex of the major food species to gauge whether any modification in diet corresponds to a change in the supply network and specifically in connection with the perceived increase in wool production. The information available from this collection will certainly provide a very useful addition to the data already gathered concerning this Middle Saxon settlement.

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APPENDIX 11: Fish Bone Assessment

Philip L. Armitage

Methodology

Over 60 fish bone elements/fragments from sieved samples were examined under low power (10X magnification) using a Motic binocular microscope. Identifications were made using the author's comparative collections and with reference to Lepiksaar (1994), Radu (2005) and Wouters *et al.* (2007). Where individual species could not be determined in certain of the smaller *gadidae* (cod family) bones, these were categorised as "small gadids", which probably comprised mostly immature cod. Similarly, the category "plaice/flounder" was applied for recording purposes when the precise species identification was uncertain for bones belonging to these two flatfishes. Measurements were taken on the freshwater eel cleithrum from Phase 9 (context [19] <sample 7) using Draper dial callipers (graduated 0.02mm) for establishing the total length in the living fish (method of Libois *et al.* 1987).

Results

Of the 60 specimens examined, 40 (66.7% of the total) are identified to species and anatomy (part skeleton). The overall state of preservation of the fish bone is fair to good. There is no evidence of burning among the specimens submitted and only a single element (a salmon vertebra from Phase 7 context [39] <20>) exhibits signs of tertiary butchery in the form of knife cut marks, probably made during consumption (cutting off the flesh from the bone).

Table 1 provides summarised counts of the numbers of identified specimens present (nisp) for each species represented, grouped according to site phase. Table 2 provides in spreadsheet format, the complete sets of recorded anatomical distributions for each species by phase/context/sample. Overall, vertebrae comprise 92.5% of the overall total nisp. Only three non-vertebrae elements are represented: 1 freshwater cleithrum ([19] <7>), 1 pike dentary ([35] <17> and 1 pike palantine bone ([96] <38>). The total length in the living freshwater eel represented by the cleithrum from context [19] is estimated at 37cm; indicating it was an immature eel (mature eels are over 40cm long – Newdick 1979, 88).

For such a relatively limited quantity of bones available for study, there is a wide range of fish species represented. In numerical terms the major species are twait shad and flatfish (plaice/flounder). Although tench also appears to be a major component in Phase 9, the five vertebrae from context [61] <28> probably derive from a single fish.

Interpretation & Discussion

The submitted fish bones from all three Phases (7, 9 & 10) at the Adelphi Building site are recognised as domestic (kitchen/table waste), which clearly indicate the inhabitants had access to a variety of freshwater, estuarine and marine species. The Adelphi samples add further support to the growing evidence that fish such as freshwater eels, twait shad, cyprinids and herring were regular items in the diet of the inhabitants of *Lundenwic* – contrary to the view that, in general, only a few fish were occasionally eaten by inhabitants of Middle Saxon *wics*, who instead relied primarily on the three main livestock taxa (cattle, sheep & pigs) for their food supply (O'Connor 2013, 4). This negative view is certainly challenged by the discovery of quantities of fish bones at the Maiden Lane site (Locker 1989) and presence of an estimated over 30,000 fish bones in twelve pits at the Lyceum site (Rackham & Snelling 2004, 64-65).

As at the other *Lundenwic* sites investigated to date, the presence of flounder, plaice and herring at the Aldelphi Building site provides further confirmation that this Middle Saxon settlement traded with fisheries operating in the lower/outer estuary of the Thames. Twait shad may also have come from these same estuarine fisheries or caught locally in the *Lundenwic* reaches of the Thames - as historic records indicate this migratory marine species before the nineteenth century was found in great abundance in the Thames as far upriver as Putney Bridge (Wheeler 1979, 143). Today the species is a rarity in the Thames. Eels and cyprinids are likely to have been caught in local freshwater rivers.

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APPENDIX 12: Oyster Shell Assessment

Rebecca Haslam and Lisa Cardy

Introduction

Excavation of the Lift Pit trench at the Adelphi Building unearthed an extensive archaeological sequence that ranged in date from the Middle Saxon period to the late 17th century. Like the animal bone, the entire oyster shell assemblage dated to the Middle Saxon period. The shells were recovered by way of an extensive environmental sampling programme.

Aims and Objectives

The primary aim at the assessment stage was to establish the degree of fragmentation and preservation of the oyster shell assemblage from the Adelphi site, to quantify the number of shells and to identify "key" samples that contained a statistically viable amount of shell. A secondary objective was to undertake a rapid visual inspection of individuals heralding from "key" samples in order to determine whether or not they displayed macroscopic quantitative and qualitative characteristics that would enable their provenance and the way in which they were harvested and processed to be deduced. Together this information will be used to determine the potential for further analysis at the publication stage.

Methodology

The oyster shells from the Adelphi site were extracted from bulk samples via wet sieving and analysed in accordance with a set of standard procedures, established and outlined by Winder (2011).

Initially, each shell was "sided" in order to determine the total number of left and right valves so that a minimum number of individuals (MNI) could be determined. For oysters, the greatest number of left or right valve totals is considered to represent the MNI (Winder 2011, 11). Statistically viable samples were then identified (i.e. those containing over 100 left and right valves).

In accordance with Winder (2011), all "measurable"[1] individuals from statistically viable samples were then obliquely illuminated with a desk lamp and visually inspected with a hand-held magnifying glass so that signs of parasitic infestation could be identified. Each complete shell was measured in millimetres with a transparent plastic ruler, whilst graph paper was used to extrapolate the size of the broken examples.

A number of qualitative characteristics pertaining to the nature of the oyster's natural habitat and its growing conditions were recorded, including the relative thickness of the shell, any irregularity of shape and the presence or absence of chambering and "chalky" deposits (Winder 2011, 18). Whether other oysters were attached and any traces of the ligament were

[1] As described by Winder (2011), criteria defining an oyster's suitability for measurement are the possession of an umboe / ligament scar, the adductor muscle scar on the internal surface and at least two thirds of the shell intact.

also noted. A number of post-mortem taphonomic qualitative characteristics were then recorded, such as the degree of wear and flakiness, post-burial staining and the presence or absence of any man-made cuts or notches.

Information relating to each individual shell was recorded per context on *pro forma* sheets and entered onto an Excel database.

Results

The oyster shell from the Adelphi site was in good condition with relatively low levels of fragmentation. The assemblage is quantified in Table 1.

Table 1: Quantification of Oyster Shell from the Adelphi Site, Arranged By Context and Sample Number

Context number	Sample number	Provisional phasing	Dating and Notes	Oyster (LV)	Oyster (RV)	Fragmented Shells (lacking umboes)	Total Number of Left and Right Valves	MNI
7	1	10	Middle Saxon	12	8	0	20	12
10	3	10	Middle Saxon	4	7	0	11	7
11	4	9	Middle Saxon	11	10	3	21	11
12	5	9	Middle Saxon	7	5	2	12	7
14	6	9	Middle Saxon	8	9	5	17	9
19	7	9	Middle Saxon	2	3	1	5	3
20	8	9	Middle Saxon	19	29	7	48	29
26	13	8	Middle Saxon	0	3	2	3	3
32	12	8	Middle Saxon	0	2	0	2	2
33	14	8	Middle Saxon	1	1	0	2	1
34	15	8	Middle Saxon	7	12	1	19	12
35	17	8	A Middle Saxon oyster midden	82	64	15	146	82
36	18	9	Middle Saxon	29	23	5	52	29
37	19	7	Middle Saxon	16	23	0	39	23
61	28	9	Middle Saxon	60	46	17	106	60
63	30	8	Middle Saxon	6	8	0	14	8
64	31	7	Middle Saxon	22	0	0	22	22
67	32	7	Middle Saxon	2	1	0	3	2
89	36	9	Middle Saxon	8	8	0	16	8
96	38	7	Middle Saxon	21	12	0	33	21
97	39	6	Middle Saxon	3	0	1	3	3
TOTALS				**320**	**274**	**59**	**594**	**354**

A total of 594 left and right valves and 59 unsided fragments were identified, which equates to an MNI of 354 for the Middle Saxon period. Sample 17 from context [35] and Sample 28 from

context [61] are of a sufficient size to enable a viable statistical analysis to be undertaken, as each contained over 100 well preserved valves (see "Left and Right Valve Total" in Table 1). The remaining contexts each contained less than 100 valves and are therefore unsuitable candidates for further analysis (Table 1).

As shown in the Catalogue, the shells from Samples 17 and 28 both exhibit a number of macroscopic characteristics that, when compared with a suitable background sample through the use of multivariate statistics, could enable the geographical origin of the oysters to be deduced. The notches and cuts that were observed could also enable the likely methods that were used to harvest and process the shells to be determined.

Conclusions and Recommendations for Further Work

The oyster shells that were recovered from the Adelphi site date to the Middle Saxon period, having been deposited by the citizens of the extramural trading centre of *Lundenwic*. As yet, few opportunities to investigate the waterfront of this important settlement have arisen and as such any archaeological finds relating to it are of the upmost importance. This statement can be applied to the entire content of the Adelphi archive, including the oyster shell assemblage that is discussed here. As such, it is recommended that the qualitative and quantitative data that was gleaned from the two statistically viable samples that were identified during the course of this assessment is further analysed at the publication stage in order to determine the likely origin of the shells and the methods that were used to collect and process them. This will further our understanding of the trading and fishing routes that were available to the residents of *Lundenwic* and better our knowledge of their technology and diet.

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Catalogue: Detailed Quantitative and Qualitative Analysis of Oyster Shell from Key Contexts [35] and [61]

KEY CONTEXT 35, SAMPLE 17

	Quantitative Data						Parasitic Infestations								Qualitative Observations											
	Oyster Left valve	Oyster Right valve	Maximum width	Maximum length	Oyster (UMLV)	Oyster (UMRV)	*Polydora ciliata*	*Polydora hoplura*	*Cliona celata*	Calcareous tubes	Barnacles	Bryozoa	Bore holes	Sand tubes	Thin	Thick	Heavy	Chambered	Chalky deposit	Worn	Flaky	Colour1stain	Oysters attached	Irregular shape	Notches and cuts	Ligament
	1		97	62																					1	
		1	52	47												1										
	1				1																					
	1		68	65									1													
	1		91	72																						
		1				1																				
	1		89	67					1																	
	1		84	72																						
	1		91	101																						
	1		105	74					1																	1
	1		61	59																						
		1	66	54																						
		1				1																	1			
		1	84	69																						
	1		68	50																			1			
	1				1																		1			

KEY CONTEXT 35, SAMPLE 17

	Quantitative Data						Parasitic Infestations								Qualitative Observations											
	Oyster Left valve	Oyster Right valve	Maximum width	Maximum length	Oyster (UMLV)	Oyster (UMRV)	*Polydora ciliata*	*Polydora hoplura*	*Cliona celata*	Calcareous tubes	Barnacles	Bryozoa	Bore holes	Sand tubes	Thin	Thick	Heavy	Chambered	Chalky deposit	Worn	Flaky	Colour1stain	Oysters attached	Irregular shape	Notches and cuts	Ligament
		1				1																				
		1	70	57									1													
	1		89	68																						
	1		75	59											1								1			
	1		80	69																						
	1		60	48																						
		1	81	58																						
	1		106	74					1																	
		1	69	60																						
	1		68	49																						
		1	55	48																						
	1				1																					
	1		58	71																						
		1	77	57																						
	1				1																					
	1		74	57															1							
		1	64	67																						
	1		61	62																			1			
		1	76	74					1																	

KEY CONTEXT 35, SAMPLE 17

	Quantitative Data						Parasitic Infestations								Qualitative Observations											
	Oyster Left valve	Oyster Right valve	Maximum width	Maximum length	Oyster (UMLV)	Oyster (UMRV)	*Polydora ciliata*	*Polydora hoplura*	*Cliona celata*	Calcareous tubes	Barnacles	Bryozoa	Bore holes	Sand tubes	Thin	Thick	Heavy	Chambered	Chalky deposit	Worn	Flaky	Colour1stain	Oysters attached	Irregular shape	Notches and cuts	Ligament
		1	86	70																						
		1	74	50																						
	1		78	66											1										1	
		1	78	78																						
	1		93	74																						
	1		93	68																						
	1		86	71																			1			1
		1	64	57																						
	1				1																				1	
		1				1																				
	1		72	64											1											
		1	87	58																						
		1	77	73																						
		1				1																				
		1	82	69																						
	1		73	59																						
		1	72	58																						
		1	56	52																						
		1	80	74																						
	1		84	74																						

KEY CONTEXT 35, SAMPLE 17

	Quantitative Data						Parasitic Infestations								Qualitative Observations											
	Oyster Left valve	Oyster Right valve	Maximum width	Maximum length	Oyster (UMLV)	Oyster (UMRV)	*Polydora ciliata*	*Polydora hoplura*	*Cliona celata*	Calcareous tubes	Barnacles	Bryozoa	Bore holes	Sand tubes	Thin	Thick	Heavy	Chambered	Chalky deposit	Worn	Flaky	Colour1stain	Oysters attached	Irregular shape	Notches and cuts	Ligament
		1				1																				
	1				1																					
	1		102	86					1																1	
	1		68	54			1																1			
	1		80	72																						
	1		80	72																						
		1	66	52											1											
		1				1																				
	1		74	71																					1	
		1	71	73																						
	1		70	60																					1	
		1	77	64																						
		1	65	46																						
	1		62	45																						
		1	61	44																						
		1	100	76																					1	
		1	62	53																						
		1	74	62																						
		1	90	69				1																		

KEY CONTEXT 35, SAMPLE 17

	Quantitative Data						Parasitic Infestations								Qualitative Observations											
	Oyster Left valve	Oyster Right valve	Maximum width	Maximum length	Oyster (UMLV)	Oyster (UMRV)	*Polydora ciliata*	*Polydora hoplura*	*Cliona celata*	Calcareous tubes	Barnacles	Bryozoa	Bore holes	Sand tubes	Thin	Thick	Heavy	Chambered	Chalky deposit	Worn	Flaky	Colour1stain	Oysters attached	Irregular shape	Notches and cuts	Ligament
		1	84	68						1																1
	1		83	68																						
	1				1																					
		1	70	70																						
	1				1																					
	1		74	53																						
	1		47	40																						
		1	67	50									1													
	1		77	62			s						1													
		1	50	51																						
	1		60	61											1											
		1	55	50																						
		1	58	54																						
	1		86	77			1																			
	1		73	65																					1	
	1		94	68																			1			
		1	74	60																						
	1		89	63																						
	1		88	58												1								1		
	1		10	73												1										

KEY CONTEXT 35, SAMPLE 17

Quantitative Data						Parasitic Infestations								Qualitative Observations											
Oyster Left valve	Oyster Right valve	Maximum width	Maximum length	Oyster (UMLV)	Oyster (UMRV)	*Polydora ciliata*	*Polydora hoplura*	*Cliona celata*	Calcareous tubes	Barnacles	Bryozoa	Bore holes	Sand tubes	Thin	Thick	Heavy	Chambered	Chalky deposit	Worn	Flaky	Colour1stain	Oysters attached	Irregular shape	Notches and cuts	Ligament
		0																							
	1				1																				
1		74	68																						
1		90	89				1															1			
1		91	75																					1	
1		80	77																						
1		83	62																						
	1	79	69									1													
1		75	62																			1			
	1				1																				
1		70	63									1											1		
1		83	70																						
	1	80	56																						
1		65	58																						
1		74	60																					1	
	1	60	64																						
1		80	66																						
	1	57	52											1											
	1	86	67																						
1		67	77																						

KEY CONTEXT 35, SAMPLE 17

	Quantitative Data						Parasitic Infestations								Qualitative Observations											
	Oyster Left valve	Oyster Right valve	Maximum width	Maximum length	Oyster (UMLV)	Oyster (UMRV)	*Polydora ciliata*	*Polydora hoplura*	*Cliona celata*	Calcareous tubes	Barnacles	Bryozoa	Bore holes	Sand tubes	Thin	Thick	Heavy	Chambered	Chalky deposit	Worn	Flaky	Colour1stain	Oysters attached	Irregular shape	Notches and cuts	Ligament
	1		69	65																						
		1	60	45											1											
		1	72	52																						
	1				1																		1			
	1				1																		1			
	1		72	50																					1	
	1				1																					
	1		106	66																					1	
		1	74	55																						
		1	58	60																						
		1	83	66																						
	1		83	62																						
		1	61	59																						
	1		92	73																						
	1		61	55																						
		1	53	49											1											
	1		93	58																						
		1	58	45																						
	1		85	89																						

KEY CONTEXT 35, SAMPLE 17

	Quantitative Data						Parasitic Infestations								Qualitative Observations											
	Oyster Left valve	Oyster Right valve	Maximum width	Maximum length	Oyster (UMLV)	Oyster (UMRV)	*Polydora ciliata*	*Polydora hoplura*	*Cliona celata*	Calcareous tubes	Barnacles	Bryozoa	Bore holes	Sand tubes	Thin	Thick	Heavy	Chambered	Chalky deposit	Worn	Flaky	Colour1stain	Oysters attached	Irregular shape	Notches and cuts	Ligament
	1		77	69																						
		1	86	70																						
	1		55	55																				1		
		1	58	59																						
		1	92	52									1			1								1		
	1		84	57																			1	1		
	1		86	67																						
	1		59	57																					1	
	1		84	61																						
		1				1							1													
		1	65	53																						
	1				1																					
	1				1																					
		1				1																				
TOTALS	**82**	**64**			**13**	**11**	**2**	**2**	**5**	**1**	**0**	**0**	**8**	**0**	**8**	**4**	**0**	**0**	**1**	**0**	**0**	**0**	**13**	**5**	**13**	**3**

KEY CONTEXT 61, SAMPLE 28

	Quantitative Data						Parasitic Infestations								Qualitative Observations										
	Oyster Left valve	Oyster Right valve	Maximum width	Maximum length	Oyster (UMLV)	Oyster (UMRV)	*Polydora ciliata*	*Polydora hoplura*	*Cliona celata*	Calcareous tubes	Barnacles	Bryozoa	Bore holes	Sand tubes	Thin	Thick	Heavy	Chambered	Chalky deposit	Worn	Flaky	Colour1stain	Oysters attached	Irregular shape	Notches and cuts	Ligament
	1				1								1													
		1	74	71																						
		1	74	68																						
		1	80	67																						
		1				1																				
		1	78	72																						
		1	105	90																						1
	1		70	62																						
		1	85	67																						
		1	86	75																						1
	1		95	77																						1
	1		120	67																				1		
	1		82	69								1														
		1	73	68																						
		1				1																				
	1		84	73																						
	1		75	73																						
		1	74	65																						
	1		82	65			1																		1	
	1		72	53																						
	1		93	89																						1

KEY CONTEXT 61, SAMPLE 28

	Quantitative Data						Parasitic Infestations								Qualitative Observations											
	Oyster Left valve	Oyster Right valve	Maximum width	Maximum length	Oyster (UMLV)	Oyster (UMRV)	*Polydora ciliata*	*Polydora hoplura*	*Cliona celata*	Calcareous tubes	Barnacles	Bryozoa	Bore holes	Sand tubes	Thin	Thick	Heavy	Chambered	Chalky deposit	Worn	Flaky	Colour1stain	Oysters attached	Irregular shape	Notches and cuts	Ligament
	1		88	77									1													
		1				1																				
		1				1																				
		1	66	63																						
	1		84	80																						
		1	80	74																						
	1				1																					
		1	104	72												1										
	1		88	82																					1	
	1		69	64																						
	1		99	68																						
		1	78	75																						
		1	65	57																						
	1		88	79																						
		1	74	59															1							
		1	68	55																						
	1		63	73																					1	
	1		104	83																						
	1		78	68																						
	1		61	42																						

KEY CONTEXT 61, SAMPLE 28

	Quantitative Data						Parasitic Infestations								Qualitative Observations										
	Oyster Left valve	Oyster Right valve	Maximum width	Maximum length	Oyster (UMLV)	Oyster (UMRV)	*Polydora ciliata*	*Polydora hoplura*	*Cliona celata*	Calcareous tubes	Barnacles	Bryozoa	Bore holes	Sand tubes	Thin	Thick	Heavy	Chambered	Chalky deposit	Worn	Flaky	Colour1stain	Oysters attached	Irregular shape	Notches and cuts	Ligament
		1	68	55																						
	1		107	85																						
	1		87	79																			1			
	1		85	82															1							
	1		90	72																						
		1	64	50																						
	1		70	58																						
	1		79	67									1													
		1	59	57																			1			
		1	88	76																						
		1	83	65															1							
	1		100	85																						
	1		90	95																						
	1		94	87																						
	1		79	75																						
	1		86	69															1							
	1				1																					
		1	69	60									1													
		1	78	67									1													
		1	60	50																						

KEY CONTEXT 61, SAMPLE 28

	Quantitative Data						Parasitic Infestations								Qualitative Observations											
	Oyster Left valve	Oyster Right valve	Maximum width	Maximum length	Oyster (UMLV)	Oyster (UMRV)	*Polydora ciliata*	*Polydora hoplura*	*Cliona celata*	Calcareous tubes	Barnacles	Bryozoa	Bore holes	Sand tubes	Thin	Thick	Heavy	Chambered	Chalky deposit	Worn	Flaky	Colour1stain	Oysters attached	Irregular shape	Notches and cuts	Ligament
	1				1																					
	1		75	62																						
	1		76	55																						
	1		60	55																						
	1		85	75															1							
		1	87	84																						
		1	76	73															1							
		1	75	65																						
		1	77	53																						
		1	85	64																						
		1	60	61																						
		1	81	72																						
		1	77	64																						
		1	65	60																						
		1	69	60																						
		1	65	62																						
		1	55	49																						
		1	72	52																						
	1		79	76																						
	1		93	71																						

KEY CONTEXT 61, SAMPLE 28

	Quantitative Data						Parasitic Infestations								Qualitative Observations										
	Oyster Left valve	Oyster Right valve	Maximum width	Maximum length	Oyster (UMLV)	Oyster (UMRV)	*Polydora ciliata*	*Polydora hoplura*	*Cliona celata*	Calcareous tubes	Barnacles	Bryozoa	Bore holes	Sand tubes	Thin	Thick	Heavy	Chambered	Chalky deposit	Worn	Flaky	Colour1stain	Oysters attached	Irregular shape	Notches and cuts	Ligament
	1		103	67																						
	1				1																					
		1	67	53																						
	1		86	68																						
	1		72	68																						
	1		67	63																						
	1		82	61																						
	1		83	49																						
		1	59	53																						
	1		68	62																						
		1	73	63																						
	1		66	54																						
	1		73	70																						
		1	87	65																						
		1				1									1											
	1		73	73																						
	1					1																				
	1		73	69																						
	1		110	72												1										
	1		63	66											1											

KEY CONTEXT 61, SAMPLE 28

	Quantitative Data						Parasitic Infestations								Qualitative Observations										
	Oyster Left valve	Oyster Right valve	Maximum width	Maximum length	Oyster (UMLV)	Oyster (UMRV)	*Polydora ciliata*	*Polydora hoplura*	*Cliona celata*	Calcareous tubes	Barnacles	Bryozoa	Bore holes	Sand tubes	Thin	Thick	Heavy	Chambered	Chalky deposit	Worn	Flaky	Colour1stain	Oysters attached	Irregular shape	Notches and cuts	Ligament
	1		63	56																						
	1		80	75																						
	1		54	62																						
	1		74	60																						
	1		57	59																						
TOTALS	60	46			5	6	1	0	0	0	0	1	5	0	2	2	0	0	6	0	0	0	2	1	3	4

APPENDIX 13: Environmental Assessment

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Introduction

This report summarises the findings arising out of the environmental archaeological assessment undertaken by Quaternary Scientific (QUEST) in connection with the proposed development at the The Adelphi Building, John Adam Street, London WC2 (Site Code: JAD14; National Grid Reference: TQ 3041 8059). The site is situated in the western part of the Middle Saxon settlement of *Lundenwic* which was occupied between the late 7th century and the mid 9th century and located in Westminster centred on the Strand, Covent Garden and Aldwych areas. The Strand was the heart of the trading 'emporium' where boats were beached to trade goods from the Continent. The Middle Saxon waterfront of *Lundenwic* was identified during excavations at 18-20 York Buildings (next door to the Adelphi Building; Cowie & Whytehead 1989). Here, sandy foreshore deposits (containing anthropogenic material including bone and oyster shell) were interpreted as accumulating naturally at the edge of a river. Stakes and revetment structures constructed in AD 679 or shortly after were driven in to these deposits, along with material laid down to create an embankment with a surface at between 0.8 and 1.3m OD (Cowie & Whytehead 1989). The embankment structure was overlain by Alluvial sediments containing seeds and Mollusca indicative of shallow, bankside and possibly tidal conditions to a level of 1.6m OD (Cowie & Whytehead 1989). Possible Middle Saxon foreshore deposits and associated embankment structures have also been recorded at 12 Buckingham Street (BHM88) and Charing Cross Station (CHA87); the top of a wooden stake at the latter was recorded at 1.19m OD (Cowie 1992).

Archaeological excavation below the basement slab in the Lift Pit trench at the Adelphi Building site was carried out by Pre-Construct Archaeology between March and May 2014. The excavations have uncovered significant remains of Middle Saxon date of regional if not national importance, including foreshore deposits in which a silver coin gilded with gold was found (provisionally dated to AD 655-675), embankment and waterfront structures including a wattle structure, brushwood and a timber river wall, levelling deposits, a timber building, metalled surfaces and cut features including pits and ditches. The earliest deposits recorded at the site were sand and gravels thought to represent natural accumulation but in places containing animal bone and pottery, dated to AD 600-750.

THE SITE

The Adelphi Building is in Central London on the north side of the River Thames between the Strand and the Victoria Embankment and about 150m from the modern waterfront. The site itself was the excavation for a new Lift Pit and measured only about 4.0m x 3.5m. The ground surface around the Adelphi Building is at a level of *c*. 14.0m OD, but the top of the archaeological horizons of interest was at a much lower level, close to 2.0m OD and the base of the sediment sequence exposed in the

excavation was at about 0.05m OD. The British Geological Survey (BGS) (1:50,000 Sheet 256 North London, 1994) shows the site underlain by Kempton Park Gravel which forms a very narrow terrace here parallel with the river and with a surface level at about 5.0m OD (cf. Gibbard 1985, fig. 33, upper section). Within or very close to the wider Adelphi Building site, the Holocene Alluvium of the Thames is shown by BGS immediately abutting the Kempton Park Gravel. The bedrock beneath the site is mapped by BGS as the Lower Tertiary London Clay. On the basis of the sediment sequence recorded during the present investigation, and considering the levels involved, it would appear that the site of the lift pit archaeological investigation in fact preserves the contact, at a level of *c*. 0.2m OD, between the Holocene Alluvium and the underlying London Clay where the latter forms the Holocene foreshore of the river and presumably rises away from the river towards the level of the Kempton Park Terrace.

The site thus represents a rare opportunity to study the Middle Saxon waterfront in London, including its management and tidal regime, currently poorly understood and highlighted as a research priority for London (Nixon *et al*. 2002). As a result, a series of bulk and column samples were obtained for environmental archaeological assessment. The assessment was carried out on selected samples, including columns <21> and <22> from the south side of the excavation (north-facing section - S1) and columns <47> and <48> from the east side of the excavation (west-facing section - S5). Columns <21> and <22> record the uppermost horizons of archaeological interest at a level between *c*. 1.25m OD and 2.0m OD. Columns <47> and <48> record the lower part of the exposed sequence down to the level of the underlying London Clay. A total of thirty bulk samples were assessed from selected features across the site.

The overarching aims of the environmental archaeological assessment were to evaluate the potential of the sediments at the site for (1) reconstructing the past economy and diet of the site's inhabitants, and (2) the general environmental context of the site and its environs, with particular emphasis on the nature and development of the Middle Saxon waterfront at *Lundenwic*. In order to achieve this aim, the environmental archaeological assessment consisted of:

1. Detailed laboratory-based description of the column samples to provide an enhanced reconstruction of the sedimentary history of the site.
2. Assessment of the preservation and concentration of pollen grains and spores in the column sample sequences to provide a preliminary reconstruction of the vegetation history, and to detect evidence for human activities, e.g. woodland clearance and cultivation.
3. Assessment of the preservation and concentration of diatom frustules in selected column sample sequences to provide a preliminary reconstruction of the hydrological history, e.g. water quality and depth.
4. Assessment of the preservation and concentration of macroscopic plant, insect and Mollusca remains from the bulk samples to provide a preliminary reconstruction of the vegetation history and general environmental context of the site.

Methods

Lithostratigraphic descriptions

The lithostratigraphy of the column samples <21>, <22>, <47> and <48> was described in the laboratory using standard procedures for recording unconsolidated sediment and organic sediments, noting the physical properties (colour), composition (gravel, sand, clay, silt and organic matter) and inclusions (e.g. artefacts). The procedure involved: (1) cleaning the samples with a spatula or scalpel blade and distilled water to remove surface contaminants; (2) recording the physical properties, most notably colour using a Munsell Soil Colour Chart; (3) recording the composition; gravel, fine sand, silt, clay and organic material; (4) recording the degree of peat humification and (5) recording the unit boundaries, e.g. sharp or diffuse. The results of the lithostratigraphic descriptions are displayed in Tables 1 to 4.

Pollen assessment

A total of twelve samples were extracted from columns <21>, <22>, <47> and <48>. The pollen was extracted as follows: (1) sampling a standard volume of sediment (1cm^3); (2) adding two tablets of the exotic clubmoss *Lycopodium clavatum* to provide a measure of pollen concentration in each sample; (3) deflocculation of the sample in 1% Sodium pyrophosphate; (4) sieving of the sample to remove coarse mineral and organic fractions (>125µ); (5) acetolysis; (6) removal of finer minerogenic fraction using Sodium polytungstate (specific gravity of 2.0g/cm^3); (7) mounting of the sample in glycerol jelly. Each stage of the procedure was preceded and followed by thorough sample cleaning in filtered distilled water. Quality control is maintained by periodic checking of residues, and assembling sample batches from various depths to test for systematic laboratory effects. Initially, an assessment of the samples was carried out, to record the concentration, preservation and main taxa of pollen and spores recorded on 10% of the slide. Pollen grains and spores were identified using the University of Reading pollen type collection and the following sources of keys and photographs: Moore *et al.* (1991); Reille (1992). The concentration of microscopic charred particles is also recorded. The results of the pollen assessment are displayed in Table 5.

Diatom assessment

Four sub-samples from column <48> were extracted for the assessment of diatoms. The diatom extraction involved the following procedures (Battarbee *et al.* 2001): (1) treatment of the sub-sample (0.2g) with Hydrogen peroxide (30%) to remove organic material and Hydrochloric acid (50%) to remove remaining carbonates; (2) centrifuging the sub-sample at 1200 for 5 minutes and washing with distilled water (4 washes); (3) removal of clay from the sub-samples in the last wash by adding a few drops of Ammonia (1%); (4) two slides prepared, each of a different concentration of the cleaned solution, were fixed in mounting medium of suitable refractive index for diatoms (Naphrax)

Duplicate slides each having two coverslips were made from each sample and fixed in Naphrax for diatom microscopy. The coverslip with the most suitable concentration of the sample preparation was selected for diatom evaluation. A large area of this coverslip was scanned for diatoms at magnifications of x400 and x1000 under phase contrast illumination using a Leica microscope. The results are displayed in Table 6.

Assessment of flots and residues

Thirty samples were processed by flotation by Pre-Construct Archaeology Ltd using 1mm and 300-micron mesh sizes, producing a flot and residue from each sample. These were rapidly assessed for macrofossil remains using a low power zoom-stereo microscope at x7-45 magnification, and the quantities and preservation of each class of macrofossil in each sample recorded (Table 7).

Preliminary identifications of the charred seeds have been made using modern comparative material and reference atlases (e.g. Jacomet 2006; Cappers *et al.* 2006; NIAB 2004). The nomenclature used follows Stace (2005). In addition, a total of ten wood charcoal samples were examined to determine the identity of the woody taxa present in each sample, and to assess the overall potential of the assemblage for further analysis. Standard procedures for the analysis of wood charcoal were followed, as described in Hather (2000). To assess the range of taxa present and physical condition of the charcoal ten fragments from each of the ten samples were picked randomly for identification. The results of the charred seed and wood charcoal identifications are shown in Figure 8. The nomenclature used follows Stace (2005).

Mollusca assessment

Flots from a total of nine samples were submitted for a more detailed Mollusca assessment. The flots were were sorted initially by eye, separating larger identifiable individuals. The flot was then dry sieved through 0.5mm and 0.25mm mesh and the residues further examined to identify the smaller species present and assess their numbers, and to identify other material of interest. The shell material was then identified either to species or to species groups (Table 9) and numbers present are noted in Table 9 as follows:

<10	1
11-50	2
51-100	3
>100	4

Identifications are based on comparison with descriptions in Beedham (1972), Ellis (1969; 1978), Kerney (1999), Kerney & Cameron (1979) and Macan (1977).

Waterlogged macrofossil assessment

A total of fifteen bulk samples (samples <32> to <46>) were processed for the recovery of macrofossil remains including waterlogged plant macrofossils, waterlogged wood and Mollusca. The extraction process involved the following procedures: (1) subsampling one litre of sediment from the sample and (2) processing the subsample by wet sieving using 300µm and 1mm mesh sizes. Each sample was scanned under a stereozoom microscope at x7-45 magnifications, and sorted into the different macrofossil classes. The concentration and preservation of remains was estimated for each class of macrofossil (Table 10).

Identifications of the archaeobotanical remains (waterlogged seeds), have been made using modern comparative material and reference atlases (e.g. Cappers *et al.* 2006; NIAB 2004). Nomenclature used follows Stace (2005). The quantities of waterlogged seeds were recorded for each sample, with identifications of the main taxa (Table 11).

Insect assessment

Four selected samples were processed for insect assessment. Samples were processed by paraffin flotation following the methodology of Atkinson *et al.,* (1987) as follows:

1. Wash bulk peat samples through a 5mm mesh using hot water to remove larger wood fragments
2. Wash remaining fraction onto a 300 micron mesh
3. Wash twice with hot water to remove the fine fraction, and two cold water washes to remove the possibility of a thermal gradient forming during the subsequent flotation
4. Drain well and mix with paraffin in a large bowl for 5 minutes
5. Decant excess paraffin back into the stock bottle through an 80 micron mesh
6. Add cold water to the organic fraction, mixing thoroughly
7. Leave to stand for 15 minutes
8. Decant the oil overlying the bulk material onto a 300 micron mesh and wash gently with detergent and hot water
9. Rinse with distilled water, dehydrate in 95% ethanol, and transfer to a sealed container for storage in 95% ethanol
10. Save remaining bulk material for further extraction of other fossil material.

Flots were scanned briefly using a low power binocular microscope (x10) to record the insect material, and to note principal beetle (Coleoptera) and bug (Hemiptera) taxa. The results of the insect assessment are diaplyed in Table 12.

Results and Interpretation of the Lithostratigraphic Descriptions

The results of the lithostratigraphic descriptions are displayed in Tables 1 to 4. The field archaeological evidence suggests that the sequence of deposits described here comprise thin units of semi-natural foreshore sediment, mainly sand or silt, interleaved among extraneous material, either dumped behind a succession of four waterfront revetments or spread over the remains of these embankments to form a stable foundation for subsequent building construction. Columns <21> and <22> were taken from the upper part of the succession from features which on the basis of the field evidence were regarded as having been 'cut through the remains of a structure that had apparently burnt down *in situ*.' Column <21> came from the fill of a ditch [14] and column <22> from the fill of a pit [13] cut into the fill of the ditch.

The compact layer at the top of Unit 2 in column <21> is probably a remnant of the 'very compact stony surface' forming context [7] which has been tentatively interpreted on the basis of the field evidence as either 'a road surface or a yard' and probably of Middle Saxon origin. Below this level in Unit 2 there is a crudely layered chaotic mixture of stony and very sandy silty clay with large amounts

of oyster shell and pieces of the bones of large vertebrates, both typically representative of food waste, together with charcoal, Mollusca, small particles of CBM and worm granules. The CBM and charcoal provide further evidence of nearby human occupation and the worm granules indicate the presence of soil material, although there is no other evidence of worm activity in the deposit, nor of any other pedological processes affecting it. This chaotic mixture forms context [14] and rests on Unit 1, a much cleaner almost free-running silty sand in which the only observed extraneous material was broken mollusc shell, probably oyster.

In the upper part of column <22>, three Units (Units 2-4) were recorded, probably representing from the top downward contexts [12], [40] and [42]. Units 2 and 4 resembled closely Unit 2 in column <21>, consisting of a chaotic mixture of stony and very sandy silty clay with large amounts of oyster shell and pieces of the bones of large vertebrates, together with charcoal, Mollusca, small particles of CBM and worm granules. The close similarity between these deposits and Unit 2 in column <21> suggests that the infill of pit [13] was derived directly from the infill of ditch [14] into which it is cut, or from the same source as the infill of the ditch. Unit 3 was a stone line separating Units 2 and 4 and is consistent with these deposits having originated as dumped material. Unit 2 at the base of this chaotic deposit rests on a cleaner, almost free-running sand (Unit 1) which incorporates charcoal and mollusc remains, including both broken shell and whole gastropods.

The general similarity between Unit 1 in column <21> and Unit 1 in column <22> suggests the possibility that these units represent the deposit into which ditch [14] was cut and which was also reached at the bottom of pit [13] where the pit cut through the infill of the ditch. These units might therefore represent part of one of the 'levelling layers', [39], [95] or [96] introduced to raise the level of the ground surface prior to building construction.

The deposits recorded in columns <48> and <47> form part of a sequence that could be traced across the whole of the east side of the archaeological excavation, falling from north to south towards the River Thames. Column <48>, in which only 0.35m of sediment was preserved, represents part of the upper part of this sequence and consists of organic-rich peaty silt and large pieces of wood, the latter identified as Units 1 and 3. The wood occupies over half the column sequence. The peaty silt incorporates small (<10mm) clasts of flint, small inclusions of bleached quartz sand, small fragments of wood and bone, charcoal, fragments of oyster shell and plant remains including seeds and well-preserved moss fronds. This deposit forms context [97] which has been interpreted on the basis of the field evidence as material dumped behind the latest of four Middle Saxon waterfront revetments (structure 169). If this interpretation is correct, the organic-rich peaty silt would appear to be redeposited with a relatively small admixture of anthropogenic debris. It is possible however that the fairly robust pieces of wood were derived from the remains of earlier revetments, or from some other source and were not originally associated with the peaty component of the deposit.

The traces of relatively clean sand adhering to the wood at the bottom of the preserved sediment in the column and the fact that the lower part of the column was void, suggests that the peaty deposit [97] rested on free-running sand which, based on the interpretation of the field evidence would represent contexts [99] and [101], described respectively as 'Layer of alternating lenses of sandy

gravel and riverine silts.' and 'Orange sand and gravel foreshore material' and together provisionally interpreted as semi-natural foreshore deposits.

The upper part of column <47> (Units 3 and 4 – a thickness of 0.26m) is occupied by a sandy deposit enclosing substantial pieces of wood, which must represent contexts [101], [159] and [160], although in the column there is no basis for distinguishing three separate units. The field record in fact indicates that all three of the identified contexts were regarded as 'waterlain' or 'foreshore' material. In the column, Unit 3 consists largely of two pieces of wood with an intervening body of free-running sand, in which no organic remains or anthropogenic material was visible. Unit 4 consisted of free-running sand, locally iron-enriched and indurated. Incorporated in the sand were small amounts of broken mollusc shell, and a complete mature oyster valve, and a piece of ?rib of a large vertebrate with probable cut mark. These sandy deposits rested on a thin (0.18m) layer of sandy gravel composed of sub-angular and well-rounded flint in which the only visible organic or anthropogenic material was broken oyster shell, including a single complete mature oyster valve. This layer can be regarded as representing context [161], described in the field record as 'indurated gravel'. In the column it rested directly on relatively unweathered (blue-green) London Clay.

Table 1: Lithostratigraphic description of column sample <21>, Section S1, the Adelphi Building, John Adam Street, London WC2 (Site Code: JAD14)

Level (m OD)	Context number	Unit No.	Composition
1.85-1.40	14	2	10YR3/2 very dark greyish brown; very poorly sorted very sandy silty clay with clasts of sub-angular and well-rounded flint (up to 40mm); chaotic with variable compaction in crude layers – compact at 1.85m-1.75m OD and 1.66m-1.60m OD; common molluscan shell debris including pieces of oyster shell, scattered complete gastropods; common bone fragments including large (75x50mm) piece at 1.55m OD and another (35x40mm) at 1.41m OD; common charcoal; well-marked transition to:
1.40-1.35	14	1	10YR3/2 very dark greyish brown; moderately sorted slightly clayey silty sand; almost free-running, massive; scattered molluscan shell debris.

The residue of a small sub-sample from Unit 2, retained on a 0.5mm sieve included: sub-angular flint, quartz sand, worm granules, CBM partcles, complete gastropods, oyster shell, bone and seeds.

Table 2: Lithostratigraphic description of column sample <22>, Section S1, the Adelphi Building, John Adam Street, London WC2 (Site Code: JAD14)

Level (m OD)	Context number	Unit No.	Composition
1.87-1.79	12	4	10YR3/2 very dark greyish brown; very poorly sorted sandy clayey silt with clasts of sub-angular and well-rouned flint (up to 35mm); chaotic; worm granules; common molluscan shell debris including pieces of oyster shell, scattered complete gastropods; bone fragments; common charcoal; well-marked transition to:
1.79-1.71	12	3	Stony layer of sub-angular and well-rounded flint in sparse matrix of sandy clayey silt/silty clay; inclined down from left to right in column, i.e. sloping down from east to west; well-marked transition to:
1.71-1.44	40	2	10YR3/2 very dark greyish brown; very poorly sorted slightly

			clayey silty sand with clasts of sub-angular and well-rounded flint (up to 35mm); chaotic, loosely compacted above becoming more compact downward; worm granules; common molluscan shell debris including pieces of oyster shell, scattered complete gastropods; bone fragments (up to 40mm); charcoal; CBM particles; well-marked transition to:
1.44-1.35	42	1	10YR4/2 dark greyish brown; moderately sorted slightly silty sand with clasts of sub-angular and well-rounded flint (up to 25mm); almost free-running, massive; common molluscan shell debris, whole gastropods; charcoal.

The residues of small sub-samples from Units 2 and 4, retained on a 0.5mm sieve included: sub-angular and well-rounded flint, quartz sand, worm granules, CBM, complete gastropods (Bithynia), freshwater bivalves (rare), bone fragments; small vertebrate bones, detrital plant remains and charcoal.

Table 3: Lithostratigraphic description of column sample <48>, Section S5, the Adelphi Building, John Adam Street, London WC2 (Site Code: JAD14)

Level (m OD)	Context number	Unit No.	Composition
1.10-1.00	97	4	10YR2/1 black; silty peat/peaty silt with clasts of sub-angular and well-rounded flint (up to 10mm) and towards the base of the unit, inclusions of bleached quartz sand; massive, crumby; finely divided detrital plant remains; scattered small pieces of oyster shell; abundant charcoal; sharp contact with:
1.00-0.90	97	3	10YR2/2 very dark brown; two pieces of round-wood (20-30mm diameter), gently inclined down from right to left in column, i.e. sloping down from north to south, separated by silty peat/peaty silt with inclusions of bleached quartz sand and an insect fragment; sharp contact with:
0.90-0.83	99	2	10YR2/1 black; gritty silty peat/ peaty silt with clasts of sub-angular and well rounded flint (up to 35mm); chaotic, crumby; finely divided detrital plant remains; scattered pieces of broken oyster shell; bone fragments; charcoal; well-marked transition to:
0.83-0.75	101	1	10YR2/2 very dark brown; mass of wood - possibly more than one piece, inclined down from right to left in column, i.e. sloping down from north to south; traces of clean quartz sand adhering to bottom of sample.
0.75-0.60		void	

The residues of small sub-samples from Units 2 and 4, retained on a 0.5mm sieve included: sub-angular flint, quartz sand, pieces of peat, wood, charcoal, oyster shell and detrital plant remains, including seeds and moss fronds.

Table 4: Lithostratigraphic description of column sample <47>, Section S5, the Adelphi Building, John Adam Street, London WC2 (Site Code: JAD14)

Level (m OD)	Context number	Unit No.	Composition
0.66-0.52	101	4	10YR5/4-5/6 yellowish brown; well sorted medium-coarse sand with some iron enrichment and associated induration, otherwise massive and free-running; scattered molluscan shell debris including complete oyster valve; piece of ?rib of large vertebrate with probable butchery mark; sharp contact with
0.52-0.40	159	3	Two pieces of wood with intervening irregular body of well sorted dark greyish brown medium sand with small (10mm) abraded natural flake of flint; sharp contact with:

0.40-0.22	160/ 161	2	10YR4/2 dark greyish brown; clast-supported gravel of sub-angular and well-rounded flint in matrix of slightly silty sand; massive; scattered detrital plant remains; broken oyster shell and complete oyster valve; sharp contact with:
0.22-0.16	162	1	London Clay

Results and Interpretation of the Pollen Assessment

Pollen is recorded in a very high concentration of pollen in a moderate to good state of preservation in all eleven of the twelve assessed samples. In each sample, the assemblage is charaterised by high values of herbaceous taxa: Lactuceae (dandelion family) and/or Poaceae (grass family; 1.38m OD) dominate with *Centaurea nigra* (knapweed), Asteraceae (daisy family), *Cirsium* type (thistles), *Sinapis* type (e.g. charlock) and sporadic occurrences of *Chenopodium* type (e.g. fat hen), Cyperaceae (sedges), *Cereale* type (e.g. barley), *Plantago* type/*Plantago lanceolata* (plantain/ribwort plantain), *Ranunculus* type (buttercup), *Rumex acetosa*/*acetosella* (sorrel), Caryophyllaceae (pinks), *Malva* (mallow) and possibly *Armeria* type (thrift), *Erodium* (storksbill) and *Campanula* type (bellflower). Tree taxa was largely absent (occasional grains of *Quercus* (oak), *Pinus* (pine), *Betula* (birch) and *Alnus* (alder) only), whilst shrub taxa included *Calluna vulgaris* (heather), *Corylus* type (e.g. hazel) and sporadic occurrences of Ericaceae (heath) and *Lonicera periclymenum* (honeysuckle). Minimal spore values were recorded (*Filicales* (ferns), *Sphagnum* (moss), *Pteridium aquilinum* (bracken) and *Polypodium vulgare* (polypody). Microcharcoal was present in moderate to abundant concentrations. The assemblage was largely consistent between samples/contexts; however, a greater concentration of cereal pollen was recorded in context [40], [42], [97] & [99].

The pollen assemblages are indicative of an open environment dominated by herbaceous taxa. Low concentrations of arboreal and shrub taxa including oak and hazel indicate either the sporadic occurrences of these trees locally to the site, the presence of hedgerows or the distant growth of woodland. Isolated occurrences of alder also indicate its limited growth within the wetland environment. The nearby, limited growth of heather is also indicated. A range of different environments are indicated by the herbaceous taxa present. Firstly, the limited presence of sedges, and most likely some of the grasses (e.g. *Phragmites australis* – common reed) is indicative of damp conditions, correlating with the evidence for nearby wetland woodland. The possible occurrence of thrift is also of interest as it may indicate a saline influence at the site. Cereal pollen grains are also commonly recorded together with their associated weeds, including fat hen, black knapweed and e.g. charlock. This suggests cultivation or crop processing and/or utilisation took place on/nearby to the site. Many of the herbs listed may also have originated from a pastoral or meadow-type community (e.g. ribwort plantain; sorrel; buttercup) and disturbed ground (e.g. fat hen; dandelion; thistle; mallow).

Table 5: Results of the pollen assessment of column samples <21>, <22>, <47> and <48> from the Adelphi Building, John Adam Street, London WC2 (Site Code: JAD14)

	Column sample	<21>			<22>				<48>				<47>
	Depth (m OD)	1.70	1.54	1.38	1.80	1.72	1.54	1.38	1.08	1.00	0.92	0.84	0.60
	Context	14	14	14	12	12	40	42	97	97	97	99	101
Latin name	**Common name**												
Trees													
Alnus	alder						1	1					
Quercus	oak		1		3	1			1	1	2	1	
Pinus	pine		1		3	1	2						
Picea	spruce						1						
Betula	birch			1									
Shrubs													
Calluna vulgaris	heather	2	2	1			1	1	1			1	
Ericaceae	heath		1										
Corylus type	e.g. hazel		2	1			2	1	2	4	2	2	
Lonicera periclymenum	honeysuckle	1											
Herbs													
Cyperaceae	sedge family		1	1	1			4		1			
Poaceae	grass family	3	4	20	2	1	8	2	21	17	8	6	
cf *Cereale* type	cereal pollen			4			2	2	2	11	7	9	
Lactuceae	dandelion family	17	25	8	14	6	12	6	3	1		4	
Asteraceae	daisy family	2	2	1		5	4	5	3	1		2	
Cirsium type	thistle	1	1	1									
Chenopodium type	e.g. fat hen		1	1		1	1	1	1	1		1	
Caryophyllaceae	pinks								1		1		
Centaurea nigra	knapweed	4	5	1	1	2	3	1	1		1		
Plantago type	plantain			1			1			1			
Plantago lanceolata	ribwort plantain							1	1	1	1		

	Column sample	<21>			<22>				<48>				<47>
	Depth (m OD)	1.70	1.54	1.38	1.80	1.72	1.54	1.38	1.08	1.00	0.92	0.84	0.60
	Context	14	14	14	12	12	40	42	97	97	97	99	101
Latin name	**Common name**												
Rumex acetosa/acetosella	sorrel									1	1		
Filipendula	meadowsweet									1			
Apiaceae	carrot family						1						
Ranunculus type	buttercup			1					2				
Sinapis type	e.g. charlock	2	2			1	2	1			1	1	
cf *Campanula* type	bellflower								1		2		
cf *Erodium*	storksbill	1											
cf *Armeria type*	thrift	1											
Malva	mallow							1					
Spores													
Filicales	ferns	1					2		1				
Sphagnum	moss				2								
Pteridium aquilinum	bracken			1		1						1	
Polypodium vulgare	polypody				1								
Unknown				4			4	6	5	4	9	6	
Unidentifiable		1	3	3									
Total Land Pollen (grains counted)		35	49	47	25	18	46	33	46	46	35	33	0
Concentration*		5	5	5	4	3	5	5	5	5	5	5	0
Preservation**		3-4	3-4	3-4	3	3	3-4	3-4	4	4	4	3-4	0
Microcharcoal Concentration***		5	5	3-4	5	5	5	5	4-5	3-4	3	5	1
Suitable for analysis		**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**NO**

Key:
**Concentration: 0 = 0 grains; 1 =1-75 grains, 2 = 76-150 grains, 3 =151-225 grains, 4 = 226-300, 5 =300+ grains per slide*
***Preservation: 0 = absent; 1 = very poor; 2 = poor; 3 = moderate; 4 = good; 5 = excellent*
****Microcharcoal Concentration: 0 = none, 1= negligible, 2 = occasional, 3 = moderate, 4 = frequent, 5 = abundant*

Results and Interpretation of the Diatom Assessment

Four sub-samples from Column <48> were extracted for the assessment of diatoms. The results of the assessment are shown in Table 6. Concentration and diversity was generally moderate to high in the four samples, with the exception of 0.92 to 0.93m OD, where the concentration and diversity of diatoms was low. Preservation was moderate to good, however in the samples from 1.08 to 1.09 and 0.92 to 0.93m OD diatom valve breakage and silica dissolution was a common occurrence, and may have altered the diatom assemblage significantly (see Flower 1993; Ryves *et al.* 2001).

Three of the four sampes are suitable for further analysis (1.08 to 1.09, 1.00 to 1.01 and 0.84 to 0.85m OD).

Table 6: Results of the diatom assessment of column sample <48>, the Adelphi Building, John Adam Street, London WC2 (Site Code: JAD14)

Depth (m OD)	Context number	Concentration	Preservation	Diversity
1.08 to 1.09	97	Very high	Moderate	Moderate
1.00 to 1.01	97	Moderate	Good	High
0.92 to 0.93	97	Low	Moderate	Low
0.84 to 0.85	99	High	Good	High

Results of the Rapid Assessment of Flots and Residues

Flots and residues from a total of 30 samples were assessed for their macrofossil remains (Table 7). Of these, 16 contained moderate to high quantities of identifiable charcoal (generally greater than 2mm in diameter on all axes): samples <1> [7] (layer, compact stony surface), <3> [10] (layer, compact stony surface), <4> [11] (layer, compact stony surface), <7> [19] (layer, possible destruction horizon), <8> [20] (pit fill), <15> [34] (layer of dumped fire debris), <17> [35] (oyster shell midden), <20> [39] (layer; high organic content), <30> [63] (layer), <31> (64) (layer; foreshore dumping), <32> [67] (layer), <37> [95] (layer; high organic content), <38> [96] (layer; high organic content), <39> [97] (layer; high organic content), <44> [100] (layer; rich in organic matter) and <46> [154] (layer; earliest foreshore deposits). The remainder of the samples contained either no charcoal; samples <2> [8] (pit fill, rich in oyster shell), <30> [63] (layer), <34> [75] (layer; very high organic content), <41> [98] (layer; high organic content), <45> [153] (layer/bank) or low quantities; <5> [12] [pit fill], <6> [14] (ditch fill), <12> [32] (layer; ?destruction horizon), <13> [26] (layer; ?clay floor), <14> [33] (layer; external surface), <18> [36] (layer), <19> [37] (pit fill), <36> [89] (pit fill) and <42> [99] (layer).

Charred seeds were recorded in low to moderate quantities in 14 samples, including samples <1> [7], <3> [10], <6> [14], <8> [20], <13> [26], <15> [34], <18> [36], <20> [39], <28> [61], <31> [64], <36> [89], <42> [99], <44> [100] and <46> [154]. No chaff was recorded during the rapid assessment. Waterlogged seeds were recorded in low to high quantities in all samples, with the exception of <2> [8] (pit fill, rich in oyster shell), <12> [32], <13> [26], <17> [35], <28> [61], <30> [63] and <32> [67]. Waterlogged wood was absent (with the exception of occasional fragments) in samples <1> to <36>, but present in moderate to high quantities in samples <37> to <45>.

Mollusca (including whole specimens) were generally present in moderate to high quantities in samples <1> to <8>, but were either absent or present in low to moderate quantities in samples <9> to

<46>. However, high quantities were recorded in samples <18> [36] and <36> [89]. Bone (generally large fragments or complete specimens) was recorded in low to moderate quantities in thirteen samples, including samples <7> [19], <20> [39], <28> [61], <30> [63], <32> [67], <34> [75], <36> [89], <37> [95], <38> [96], <42> [99], <44> [100], <45> [153] and <46> [154]. Insects were recorded in low quantities in one sample (<46> [154].

Table 7: Results of the rapid assessment of flots and residues from the Adelphi Building, John Adam Street, London WC2 (Site Code: JAD14)

								Charred					Uncharred		Bone			Mollusca			
Sample number	Context number	Phase	Context type/description	Size of context sampled (%)	Total volume processed (l)	Flot weight (g)	Fraction	Charcoal (>4mm)	Charcoal (2-4mm)	Charcoal (<2mm)	Seeds	Chaff	Wood	Seeds	Large	Small	Fragments	Whole	Fragments	Insects	Pottery
1	7	10	Layer; compact stony surface	<5	N/A	44	Flot		-	-	2	-	-	5	-	-	-	5	-	-	-
							Residue	2	1	1	1	-	-	-	-	-	-	3	1	-	-
2	8	10	Pit fill; rich in oyster shell	55-75	N/A	<1	Flot	-	-	-	-	-	-	-	-	-	-	1	-	-	-
							Residue	-	-	-	-	-	-	-	-	-	-	-	1	-	-
3	10	10	Layer; compact stony surface	<5	N/A	43	Flot	1	-	5	1	-	-	5	-	-	-	5	-	-	-
							Residue	1	3	-	-	-	-	-	-	-	-	4	1	-	-
4	11	9	Layer; compact stony surface	<5	N/A	35	Flot	1	-	-	-	-	1	5	-	-	1	5	-	-	-
							Residue	1	2	-	-	-	-	-	-	-	-	2	1	-	-
5	12	9	Pit fill	<5	N/A	35	Flot	-	-	-	-	-	-	5	-	-	-	5	-	-	-
							Residue	1	-	-	-	-	-	-	-	-	-	2	1	-	-
6	14	9	Ditch fill	<5	N/A	96	Flot	-	-	-	1	-	-	4	-	-	-	5	-	-	-
							Residue	1	1	-	-	-	-	-	-	-	-	3	1	-	-
7	19	9	Layer; possible destruction horizon of Saxon building	55-75	N/A	15	Flot	-	-	-	-	-	-	3	-	1	-	3	-	-	-
							Residue	3	1	1	-	-	-	-	-	1	1	1	-	-	-
8	20	9	Pit fill; contains	55-75	N/A	12	Flot	1	-	5	1	-	-	2	-	-	-	3	-	-	-

								Charred					Uncharred		Bone			Mollusca			
Sample number	Context number	Phase	Context type/description	Size of context sampled (%)	Total volume processed (l)	Flot weight (g)	Fraction	Charcoal (>4mm)	Charcoal (2-4mm)	Charcoal (<2mm)	Seeds	Chaff	Wood	Seeds	Large	Small	Fragments	Whole	Fragments	Insects	Pottery
			probable fire debris from Saxon building				Residue	4	1	1	1	-	-	-	-	-	-	-	2	-	-
18	36	9	Layer	55-75	N/A	31	Flot	-	-	-	1	-	-	4	-	-	-	5	-	-	-
							Residue	1	1	-	-	-	-	-	-	-	-	1	1	-	-
28	61	9	Layer; large oyster shell content	100	N/A	15	Flot	1	-	-	1	-	-	-	-	1	-	-	-	-	-
							Residue	1	4	1	-	-	-	-	-	-	-	1	2	-	-
36	89	9	Pit fill; base of a pit excavated higher up in the sequence	<5	N/A	39*	Flot	1	1	-	1	-	-	5	-	-	-	5	-	-	-
							Residue	1	-	-	-	-	-	-	1	-	-	-	1	-	-
12	32	8	Layer; destruction horizon from building?	100	N/A	<1	Flot	-	-	-	-	-	-	-	-	-	-	-	-	-	-
							Residue	1	1	-	-	-	-	-	-	-	-	1	1	-	-
13	26	8	Layer; believed to be a clay floor of a Saxon building	100	N/A	4	Flot	-	1	-	1	-	-	-	-	-	-	1	-	-	-
							Residue	1	1	-	-	-	-	-	-	-	-	1	-	-	-
14	33	8	Layer; external surface associated with Saxon building	55-75	N/A	6	Flot	-	-	-	-	-	-	1	-	-	-	1	-	-	-
							Residue	1	1	-	-	-	-	-	-	-	-	-	-	-	-
15	34	8	Layer of dumped fire	100	N/A	5	Flot	-	-	-	1	-	-	1	-	-	-	-	-	-	-

								Charred					Uncharred		Bone			Mollusca			
Sample number	Context number	Phase	Context type/description	Size of context sampled (%)	Total volume processed (l)	Flot weight (g)	Fraction	Charcoal (>4mm)	Charcoal (2-4mm)	Charcoal (<2mm)	Seeds	Chaff	Wood	Seeds	Large	Small	Fragments	Whole	Fragments	Insects	Pottery
			debris below Saxon building				Residue	3	2	-	-	-	-	-	-	-	-	-	-	-	-
17	35	7	Oyster shell midden	5-15	N/A	N/A	Flot	-	-	-	-	-	-	-	-	-	-	-	-	-	-
							Residue	3	3	-	-	-	-	-	-	-	-	1	1	-	-
19	37	7	Pit fill; large oyster shell content	100	N/A	5	Flot	-	1	-	-	-	-	1	-	-	-	1	-	-	-
							Residue	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20	39	7	Layer; high organic content.	25-45	N/A	4	Flot	1	-	2	1	-	-	1	-	-	-	-	-	-	-
							Residue	4	4	1	-	-	1	-	-	-	1	1	1	-	-
30	63	7	Layer	N/A	N/A	N/A	Flot	-	-	-	-	-	-	-	-	-	-	-	-	-	-
							Residue	-	-	-	-	-	-	-	1	-	-	2	-	-	-
31	64	7	Layer; foreshore dumping	N/A	N/A	18	Flot	2	2	3	1	-	-	1	-	-	-	1	-	-	-
							Residue	4	4	-	-	-	-	-	-	-	-	-	-	-	-
32	67	7	Layer	N/A	N/A	7	Flot	1	-	-	-	-	-	-	-	-	-	1	-	-	-
							Residue	2	1	-	-	-	-	-	1	-	-	1	-	-	-
34	75	6	Layer; very high organic content.	5-15	N/A	11	Flot	-	-	-	-	-	1	3	-	-	-	-	-	-	-
							Residue	-	-	-	-	-	-	-	3	-	-	-	-	-	-

								Charred					Uncharred		Bone			Mollusca			
Sample number	**Context number**	**Phase**	**Context type/description**	**Size of context sampled (%)**	**Total volume processed (l)**	**Flot weight (g)**	**Fraction**	**Charcoal (>4mm)**	**Charcoal (2-4mm)**	**Charcoal (<2mm)**	**Seeds**	**Chaff**	**Wood**	**Seeds**	**Large**	**Small**	**Fragments**	**Whole**	**Fragments**	**Insects**	**Pottery**
37	95	7	Layer; animal bone, oyster shell, high organic content	<5	N/A	N/A*	Flot	3	3	-	-	-	2	5	-	-	-	-	-	-	-
							Residue	-	-	-	-	-	-	-	1	-	-	1	-	-	-
38	96	7	Layer; high organic content	5-15	N/A	N/A*	Flot	2	2	3	-	-	4	5	-	-	-	1	-	-	-
							Residue	2	2	-	-	-	-	-	1	-	-	2	-	-	-
39	97	6	Layer; high organic content	<5	N/A	N/A*	Flot	2	2	-	-	-	2	3	-	-	-	-	-	-	-
							Residue	-	-	-	-	-	-	-	-	-	-	-	-	-	-
41	98	5	Layer; high organic content	15-25	N/A	N/A*	Flot	-	-	-	-	-	3	3	-	-	-	-	-	-	-
							Residue	-	-	-	-	-	-	1	-	-	-	-	-	-	-
42	99	5	Layer; very organic in patches, compressed or compacted vegetation	<5	N/A	N/A	Flot	-	-	-	1	-	2	5	-	-	-	-	-	-	-
							Residue	-	-	-	-	-	-	-	1	-	-	-	-	-	-
44	100	5	Layer; rich in organic matter	5-15	N/A	N/A*	Flot	2	2	2	1	-	3	2	-	-	-	-	-	-	-
							Residue	1	-	-	-	-	-	-	1	-	-	1	-	-	-
45	153	3	Layer/bank; wattle/brushwood fragments within sample, possible plant remains, animal bone. One of	<5	N/A	N/A*	Flot	-	-	-	-	-	2	1	-	-	-	-	-	-	-
							Residue	-	-	-	-	-	-	-	1	-	-	1	-	-	-

								Charred					Uncharred		Bone			Mollusca			
Sample number	Context number	Phase	Context type/description	Size of context sampled (%)	Total volume processed (l)	Flot weight (g)	Fraction	Charcoal (>4mm)	Charcoal (2-4mm)	Charcoal (<2mm)	Seeds	Chaff	Wood	Seeds	Large	Small	Fragments	Whole	Fragments	Insects	Pottery
			earliest deposits																		
46	154	2	Layer; earliest foreshore deposits	100	N/A	281*	Flot	2	2	3	1	-	5	3	-	-	-	-	-	1	-
							Residue	-	-	-	1	-	-	-	1	-	-	1	-	-	-

Key: 0 = Estimated Minimum Number of Specimens (MNS) = 0; 1 = 1 to 25; 2 = 26 to 50; 3 = 51 to 75; 4 = 76 to 100; 5 = 101+
*flots processed by wet sieving due to organic, sediment-rich nature of sample

Results and Interpretation of the Plant Macrofossil Assessment (Seeds and Wood Charcoal)

During the rapid assessment of the flots and residues it was highlighted that 16 samples contained moderate to high quantities of identifiable charcoal; of these, the flots of ten selected samples were submitted for a more detailed assessment and identification of a minimum of ten fragments in each sample. In addition, flots from a total of 18 samples underwent a more detailed assessment of the charred and waterlogged seed remains. The results of the plant macrofossil assessment of the flots and residues are shown in Table 8.

Charcoal identifications

A total of eight taxa were identified during the assessment: *Acer campestre* (field maple), *Corylus avellana* (hazel), *Quercus* sp. (oak), *Betula* sp. (birch), *Salix/Populus* sp. (willow/poplar), *Fagus sylvatica* (beech) Maloideae (includes hawthorn, apple, pear), and *cf. Rhamnus* sp. (buckthorn) (Table 8). All the woods identified are hardwoods (Angiosperm) native to the United Kingdom. No softwoods (Gymnosperm) or alien taxa were identified. The fragments contained in each sample are well preserved and of ample size for analysis. The range of taxa identifed indicates the availability of a floristically rich environment. In most samples the charcoal examined included mature and young wood (twig wood) of most of the tree and shrub taxa identified. If a fuller more detailed analysis was undertaken the range of taxa identified is likely to increase, albeit modestly, and it would be possible to determine the relative abundance of each taxon. Almost all of the tree taxa identified are those traditionally managed, further analysis may determine if any of the fragments retain anatomical characteristics suggestive of silvicultural practises such as coppicing.

Seed identifications

The assemblage in samples <1> to <8> and <18> (Phases 9 and 10) was composed primarily of waterlogged (uncharred) seeds of *Sambucus nigra*/*racemosa* (elder) and charred seeds of *Hordeum*/*Triticum* sp. (barley/wheat), with occasional seeds of Poaceae (grass family) and *Ranunculus repens* (creeping buttercup). The occurrence of herbaceous taxa was limited in these samples, perhaps suggesting that they are more typical of waste deposits in which the remains of edible taxa have accumulated.

The assemblage in samples <34> to <45> (Phase 2 to 7 and one sample from Phase 9) was composed primarily of uncharred seeds of herbaceous taxa, including *Ranunculus sceleratus* (celery-leaved buttercup), *Chenopodium album* (fat-hen), *Rumex*/*Polygonum* sp. (dock/sorrel/knotweed), *Ranunculus repens* (creeping buttercup), Apiaceae (carrot family), Poaceae (grass family), *Persicaria* sp. (smartweed), *Silene*/*Stellaria* sp. (campion/stitchwort), *Eleocharis* sp. (spikesedge), cf. *Scirpus* sp. (bulrush), *Lycopus europaeus* (gypsywort) and cf. *Carex* sp. (sedges). Shrub taxa were also present, including *Sambucus nigra*/*racemosa* (elder), *Rubus fruticosus* (blackberry) and *Prunus* cf. *spinosa* (blackthorn). Charred taxa were present in selected samples, and included *Hordeum*/*Triticum* sp. (barley/wheat) and *Vitis* cf. *vinifera* (common grape vine).

The assemblage in these samples is typical of a relatively damp, open environment dominated by herbaceous taxa, with an indication of wet conditions nearby in selected samples from Phases 2 and 5

(e.g. <45> [153] (layer/bank) and <44> [100] (layer)). Taxa typical of those found in waste deposits are occasionaly recorded, including charred remains of barley/wheat, common grape vine and blackthorn.

Table 8: Results of the plant macrofossil assessment of flots from the Adelphi Building, John Adam Street, London WC2 (Site Code: JAD14)

Sample number	Context number	Phase	Context description	Charcoal identification	Quantity	Weight (g)	Seed identification (c) = charred	Quantity
1	7	10	Layer; compact stony surface	*Corylus avellana* *Fagus sylvatica* *Quercus* sp.	2 2 6	1.358 0.501 1.112	*Sambucus nigra*/*racemosa* *Hordeum*/*Triticum* sp. (c) Poaceae	>50 11 1
3	10	10	Layer; compact stony surface	*Corylus avellana* Maloideae *Quercus* sp.	1 1 8	0.221 0.093 3.894	*Sambucus nigra*/*racemosa* *Hordeum*/*Triticum* sp. (c)	>50 2
4	11	9	Layer; compact stony surface	-	-	-	*Sambucus nigra*/*racemosa* *Hordeum*/*Triticum* sp. (c)	>50 1
5	12	9	Pit fill	-	-	-	*Sambucus nigra*/*racemosa* *Hordeum*/*Triticum* sp. (c)	>50 1
6	14	9	Ditch fill	-	-	-	*Sambucus nigra*/*racemosa* *Hordeum*/*Triticum* sp. (c)	>50 4
7	19	9	Layer; possible destruction horizon of Saxon building	*Corylus avellana* *Fagus sylvatica* Maloideae *Quercus* sp.	2 1 3 4	0.607 0.394 1.204 3.172	*Sambucus nigra*/*racemosa* *Ranunculus repens*	10 1
8	20	9	Pit fill; contains probable fire debris from Saxon building	*Corylus avellana* *Quercus* sp. *cf. Rhamnus* sp.	2 6 2	1.429 4.889 0.987	*Sambucus nigra*/*racemosa* *Ranunculus repens* *Hordeum*/*Triticum* sp. (c)	19 1 2
18	36	9	Layer	-	-	-	*Sambucus nigra*/*racemosa* *Hordeum*/*Triticum* sp. (c)	>50 1
28	61	9	Layer; large oyster shell content	*Acer campestre* *Corylus avellana* *Quercus* sp.	1 1 8	1.505 0.170 2.076	-	-

Sample number	Context number	Phase	Context description	Charcoal identification	Quantity	Weight (g)	Seed identification (c) = charred	Quantity
36	89	9	Pit fill; base of a pit excavated higher up in the sequence	-	-	-	*Sambucus nigra*/*racemosa* *Chenopodium album* *Ranunculus repens* *Hordeum/Triticum* sp. (c) *Rumex*/*Polygonum* sp. *Prunus* cf. *spinosa*	>50 25 2 2 1 1
15	34	8	Layer of dumped fire debris below Saxon building	*Acer campestre* *Corylus avellana* *Quercus* sp. Indeterminate (hardwood)	1 5 3 1	0.595 6.047 2.281 0.310	-	-
17	35	7	Oyster shell midden	*Betula* sp. *Corylus avellana* *Fraxinus excelsior* *Quercus* sp.	1 1 1 7	0.139 0.556 0.065 1.937	-	-
20	39	7	Layer; high organic content.	*Acer campestre* *Betula* sp. *Corylus avellana* *Quercus* sp.	1 1 1 7	0.251 0.158 0.091 1.350	-	-
31	64	7	Layer; foreshore dumping	*Quercus* sp. *Salix*/*Populus* sp.	8 2	3.528 1.254	-	-
37	95	7	Layer; animal bone, oyster shell, high organic content	-	-	-	*Chenopodium album* *Persicaria* sp. *Ranunculus repens* *Ranunculus sceleratus* *Rumex*/*Polygonum* sp. *Hordeum/Triticum* sp. (c)	4 2 2 2 1 1
38	96	7	Layer; high organic content	*Corylus avellana* *Quercus* sp. *Salix*/*Populus* sp.	3 4 3	0.355 1.367 0.639	*Chenopodium album* *Ranunculus repens* *Rumex*/*Polygonum* sp. *Silene*/*Stellaria* sp.	43 6 2 1
34	75	6	Layer; very high organic content.	-	-	-	*Rubus fruticosus* *Chenopodium album*	1 1

Sample number	Context number	Phase	Context description	Charcoal identification	Quantity	Weight (g)	Seed identification (c) = charred	Quantity
39	97	6	Layer; high organic content	-	-	-	*Chenopodium album* *Rumex*/*Polygonum* sp. *Ranunculus sceleratus* *Rubus fruticosus* *Ranunculus repens* Apiaceae *Persicaria* sp.	11 1 1 1 1 1 1
41	98	5	Layer; high organic content	-	-	-	*Chenopodium album* *Rumex*/*Polygonum* sp.*Ranunculus repens* *Persicaria* sp. *Ranunculus sceleratus* *Eleocharis* sp.	6 3 2 2 2 1
42	99	5	Layer; very organic in patches, compressed or compacted vegetation	-	-	-	*Ranunculus sceleratus* *Chenopodium album* *Vitis* cf. *vinifera* (c) *Ranunculus repens* *Hordeum/Triticum* sp. (c) *Rubus fruticosus* *Rumex*/*Polygonum* sp. Apiaceae *Persicaria* sp.	12 5 3 3 3 1 1 1 1
44	100	5	Layer; rich in organic matter	-	-	-	*Chenopodium album* *Ranunculus sceleratus* cf. *Scirpus* sp. *Prunus* cf. *spinosa Ranunculus repens* *Hordeum/Triticum* sp. (c) *Lycopus europaeus*	3 2 1 1 1 1 1
45	153	3	Layer/bank; wattle/brushwood fragments within sample, possible plant remains, animal bone. One of earliest deposits	-	-	-	*Rumex*/*Polygonum* sp. cf. *Carex* sp. Poaceae	1 1 1

Sample number	Context number	Phase	Context description	Charcoal identification	Quantity	Weight (g)	Seed identification (c) = charred	Quantity
46	154	2	Layer; earliest foreshore deposits	-	-	-	*Chenopodium album* *Prunus* cf. *spinosa* *Rubus fruticosus* *Lycopus europaeus* *Hordeum/Triticum* sp. (c)	3 3 2 1 1

Results and Interpretation of the Mollusca Assessment

A total of nine samples were assessed for Mollusca. Three of the samples (<13>, <20>, <38>) consisted of shells already separated from flot and comprised only a small number of individuals (<10). The remaining six samples consisted of unsorted flot each containing several hundred individual shells and large amounts of shell debris.

All the mollusc assemblages derived from the six unsorted flot samples (<1>, <3>, <4>, <5>, <6>, <18>; Phases 9 and 10) were closely similar in terms of the principal species represented and in terms of the relative numbers of those species. In all these samples *B. tentaculata* was present in large numbers. A total of 761 was counted in a sub-sample of sample <6> and in all the other samples it was the overwhelmingly dominant species. Only two other species, *V. piscinalis* and *Trichia*, were represented in any of the samples by more than 50 individuals. All other species were represented by fewer than 50 individuals, in some cases by only one or two individuals in only one of the samples, e.g. *Balea perversa* and *Vertigo* in samples <18> and <6> respectively. All the assemblages were mixtures of freshwater and terrestrial species. Freshwater habitats were principally represented by *Theodoxus fluviatalis, Valvata, Bithynia*, the *Lymnaeae* and the Planorbids; terrestrial habitats principally by *Trichia, Cochlicopa, Carychium* and the Zonitoides all of which prefer moist conditions. Other terrestrial habitats were represented by small numbers of other species, such as *Discus rotundatus*, often found in woodland and a single specimen of the tree-dwelling species *Balea perversa*. The presence of the burrowing snail *Cecilioides acicula* in all the unsorted flot samples indicates that the deposit from which these samples came either included soil material or was affected by soil forming processes. This conclusion is supported by the occurrence of worm granules, noted in sample <4> and is consistent with the presence of terrestrial species in the mollusc fauna.

In five of the samples, single specimens of marine species were present, immature whelks (*Buccinum undatum*) in samples <1>, <4> and <20>, winkles (*Littorina* sp.) in samples <6> and <38>, and a single valve of a juvenile oyster (*Ostrea edule*) in sample <6>. There was also typical oyster shell debris in all the unsorted flot samples. Two other notable features of the mollusc assemblage are, firstly the complete absence from all the unsorted flot samples of the opercula of *Bithynia*, despite the large numbers of this species present in all the samples; and secondly the general absence of the Sphaeridiiae. Only one valve, probably of a *Pisidium* species was recorded.

In attempting to understand the significance of these mollusc assemblages, it is essential to recognise that they are all associated with deposits that have been substantially affected by human activity and probably in all cases redistributed away from their primary depositional context. Samples <1>, <3> and <4> came from levelling layers overlying the remains of a mid Saxon building. Sample <5> came from a pit [13] cut into these layers and samples <6> and <18> came from a ditch [15] also cut into these layers. Judging by the similarity among the mollusc assemblages in samples <1>, <3> and <4>, the material forming the layers from which these samples came was all derived from the same depositional source. The mollusc assemblages from the pit and ditch cut into these layers resemble closely the assemblages in the layers themselves, indicating that the fills were largely, if not entirely, derived from the layers, or possibly from the same source as the layers. The presence of a few

specimens of edible marine species in these samples and the common occurrence of probable oyster shell debris suggests that the deposits from which the samples came were contaminated with food waste, or that food waste contaminated the layers after they were put in place. It is also possible that once the layers had been put in place they became the habitat of mollusc species other than those present in the original deposit.

The species represented in the samples consist largely of a mixture of species characteristic of large, well-oxygenated water bodies, e.g. *Theodoxus, Valvata* and *Bithynia*, and species characteristic of moist terrestrial habitats, e.g. *Cochlicopa* and *D.rotundatus*. Bearing in mind the preponderance of *Bithynia*, the lack of *Bithynia* opercula and the lack of the Sphaeriidae, such a mixture might be found on the floodplain of a large river in moist hollows subject to seasonal flooding. However some of the species present, such as *Helix aspersa* and *Trichia* could relate to habitats developing on the new land surface created by the dumping of the layers forming contexts [7], [10] and [11].

Sample <13> came from a deposit tentatively identified as the burnt clay floor of the Saxon building underlying the layers described in the previous paragraph. The sample consisted of shells already separated from flot or hand-picked from bulk samples.Very few snails were submitted for assessment in this sample, but both aquatic and terrestrial species were present suggesting a broad similarity with the overlying layers.

Samples <20> and <38> (Phase 7) were both from layers underlying the Saxon building mentioned above. The field evidence suggests that these layers were put in place in Saxon times to raise the level of the ground above the level of diurnal flooding to form a surface for building construction. The samples examined consisted of shells already separated from flot or hand-picked from bulk samples. They comprised single specimens of *Buccinum* (whelk) and *Bithynia* in sample <18> and a single specimen of *Littorina* (winkle) in sample <38>. The presence of edible species is consistent with the field evidence that these layers 'were composed principally of domestic waste, a large proportion of which was related to food supply… in the form of animal bone and oyster shell.'

Table 9: Results of the Mollusca assessment of flots from the Adelphi Building, John Adam Street, London WC2 (Site Code: JAD14)

Sample	<1>	<3>	<4>	<5>	<6>	<18>	<13>	<20>	<38>
Context	7	10	11	12	14	36	26	39	96
Phase	10	10	9	9	9	9	8	7	7
Littorina sp.					1				1
Buccinum undatum	1		1					1	
Ostrea sp.	x	x	x	x	1	x			
Theodoxus fluviatilis	1		1	1	1	1			
Valvata piscinalis	2	2	2	2	3	3			
Bithynia tentaculata	4	4	4	4	4	4	1	1	
Carychium minimum	2	2	2	2	2	2			
Lymnaea truncatula	2	2	2	2	2	2			
Lymnaea peregra	2	2	2	2	2	2			

Planorbis sp.	1	1	1	1	1	1			
Anisus sp.	2	2	2	2	2	2			
Succineidae					1	1			
Cochlicopa lubrica	2	2	1	2	2	2			
Vertigo sp.					1				
Vallonia sp.	1	1	1	2	2	2			
Discus rotundatus	1		2	1	2	1			
Zonitidae	2	2	2	2	2	2			
Ceciloides acicula	2	1	1	2	2	1			
Balea perversa						1			
Trichia hispida	3	2	3	3	2	3	1		
Cepaea nemoralis				1		1			
Helix aspersa	1		1	1	1				
Sphaeriidae							1		

Key: 1 = number of speciments = <10, 2 = 11-50, 3 = 51-100, 4 = >100.

Results and Interpretation of the Waterlogged Macrofossil Assessment of the Wet-Sieved Bulk Samples

A total of 14 wet-sieved bulk samples (samples <30> to <46>; Phases 2 to 9) were assessed for their preservation and concentration of macrofossil remains (Table 10). Moderate to high quantities of identifiable charcoal were recorded in all but one sample (<45> [153] (layer/bank)), whilst charred seeds were recorded in two samples (<36> [89] (pit fill) and <41> [98] (layer; high organic content)). Waterlogged wood was recorded in all but two samples (<36> {89] (pit fill) and <44> [100] (layer; rich in organic matter)), whilst waterlogged seeds were present in all but three samples (<30> [63] (layer), <31> {64] (layer; foreshore dumping) and <45> {153] (layer/bank)).

Bone, predominantly in large fragments or whole specimens was recorded in low to moderate quantities in all but three samples, including <42> [99] (layer), <45> [153] (layer/bank) and <46> [154] (layer; earliest foreshore deposits). Mollusca, much of which appeared to be shells of oyster, was present in low to moderate quantities in all but samples <32> [67] (layer), <39> [97] (layer; high organic content), <41> [98] (layer; high organic content) and <46> [154]. Insects were recorded in moderate to high quantities in samples <33> [76] (layer), <34> [75] (layer; high organic content), <38> [96] (layer; high organic content), <41> [98] and <44> [100], whilst an additional four samples contained low concentrations.

Results of the Waterlogged Plant Macrofossil Assessment (Seeds)

During the macrofossil assessment of the wet-sieved bulk samples it was highlighted that 11 samples contained waterlogged and/or charred seeds; these samples thus underwent a more detailed assessment of the seed remains (Table 11).

As might be expected the assemblage recorded in the wet-sieved bulk samples (samples <32> to <46>) is very similar to that recorded in the corresponding flots (see above). The assemblage in

samples <32> to <46> is composed mainly of uncharred seeds of herbaceous taxa, including *Ranunculus sceleratus* (celery-leaved buttercup), *Chenopodium album* (fat-hen), *Rumex*/*Polygonum* sp. (dock/sorrel/knotweed), *Ranunculus repens* (creeping buttercup), *Persicaria* sp. (smartweed), *Eleocharis* sp. (spikesedge), *Lycopus europaeus* (gypsywort) and *Carex* sp. (sedges). The aquatic taxa *Sparganium erectum* (bur-reed) and *Ranunculus fluitans* (river water crowfoot) were also present. Shrub and tree taxa were also present, including *Sambucus nigra*/*racemosa* (elder), *Corylus avellana* (hazelnut) and *Alnus* sp. (alder).

Charred taxa were present in selected samples (including <36> [89] (pit fill) and <41> [98] (layer; high organic content), and included *Hordeum*/*Triticum* sp. (barley/wheat) and *Vitis* cf. *vinifera* (common grape vine).

The assemblage in these samples is typical of a relatively damp, open environment typical of the margins of a fen or reed swamp, with an indication of wet conditions supporting the growth of aquatic taxa nearby. There are no clear indications in the seed assemblages for a saline influence. Taxa typical of those found in waste deposits were recorded in two samples (<36> [89] and <41> [98]), including charred remains of barley/wheat and common grape vine, perhaps indicative of disturbance of these deposits.

Table 10: Results of the waterlogged macrofossil assessment of wet-sieved bulk samples from the Adelphi Building, John Adam Street, London WC2 (Site Code: JAD14)

						Charred					Uncharred		Bone			Mollusca			
Sample number	Context number	Phase	Context type/description	Total volume processed (l)	Fraction	Charcoal (>4mm)	Charcoal (2-4mm)	Charcoal (<2mm)	Seeds	Chaff	Wood	Seeds	Large	Small	Fragments	Whole	Fragments	Insects	Pottery
36	89	9	Pit fill; base of a pit excavated higher up in the sequence	1.0	>300µm	-	-	2	-	-	-	2	-	-	-	-	3	-	-
					>1mm	2	2	-	1	-	-	1	2	2	2	2	4	-	-
30	63	7	Layer	1.0	>300µm	-	-	4	-	-	1	-	-	-	-	-	2	-	-
					>1mm	4	3	-	-	-	-	-	1	2	3	-	4	-	-
31	64	7	Layer; foreshore dumping	1.0	>300µm	-	-	5	-	-	1	-	-	-	-	-	2	-	-
					>1mm	3	2	1	-	-	-	-	1	-	3	1	2	-	-
32	67	7	Layer	1.0	>300µm	-	-	5	-	-	-	1	-	-	-	-	-	-	-
					>1mm	3	3	-	-	-	3	1	-	1	2	-	-	-	-
37	95	7	Layer; animal bone, oyster shell, high organic content	1.0	>300µm	-	-	4	-	-	-	1	-	-	-	-	3	-	-
					>1mm	3	3	-	-	-	1	2	1	-	2	-	1	-	-
33	76	6	Layer	1.0	>300µm	-	-	2	-	-	1	1	-	-	-	-	2	2	-
					>1mm	2	2	-	-	-	4	1	2	1	3	-	1	-	-
34	75	6	Layer; very high organic content.	1.0	>300µm	-	-	-	-	-	1	2	-	-	-	-	-	3	-
					>1mm	2	2	-	-	-	2	2	1	1	2	-	2	-	-

						Charred					Uncharred		Bone			Mollusca			
Sample number	Context number	Phase	Context type/description	Total volume processed (l)	Fraction	Charcoal (>4mm)	Charcoal (2-4mm)	Charcoal (<2mm)	Seeds	Chaff	Wood	Seeds	Large	Small	Fragments	Whole	Fragments	Insects	Pottery
38	96	7	Layer; high organic content	1.0	>300µm	-	-	2	-	-	-	1	-	-	-	-	1	2	-
					>1mm	2	2	-	-	-	2	2	-	-	2	-	2	-	-
39	97	6	Layer; high organic content	1.0	>300µm	-	-	2	-	-	-	1	-	-	-	-	-	1	-
					>1mm	2	2	-	-	-	3	2	-	-	2	-	-	-	-
41	98	5	Layer; high organic content	1.0	>300µm	-	-	-	-	-	-	1	-	-	-	-	-	2	-
					>1mm	2	2	-	1	-	3	1	-	-	1	-	-	-	-
42	99	5	Layer; very organic in patches, compressed or compacted vegetation	1.0	>300µm	-	-	-	-	-	-	3	-	-	-	-	-	1	-
					>1mm	2	2	-	-	-	4	2	-	-	-	-	1	1	-
44	100	5	Layer; rich in organic matter	1.0	>300µm	-	-	-	-	-	-	1	-	-	-	-	1	2	-
					>1mm	3	3	-	-	-	-	-	-	1	2	-	-	-	-
45	153	3	Layer/bank; wattle/brushwood fragments within sample, possible plant remains, animal bone. One of earliest deposits	1.0	>300µm	-	-	-	-	-	-	-	-	-	-	-	1	1	-
					>1mm	-	-	-	-	-	5	-	-	-	-	-	2	-	-
46	154	2	Layer; earliest	1.0	>300µm	-	-	3	-	-	-	-	-	-	-	-	-	-	-

						Charred					Uncharred		Bone			Mollusca			
Sample number	Context number	Phase	Context type/description	Total volume processed (l)	Fraction	Charcoal (>4mm)	Charcoal (2-4mm)	Charcoal (<2mm)	Seeds	Chaff	Wood	Seeds	Large	Small	Fragments	Whole	Fragments	Insects	Pottery
			foreshore deposits		>1mm	1	2	1	-	-	1	1	-	-	-	-	-	-	-

Key: 0 = Estimated Minimum Number of Specimens (MNS) = 0; 1 = 1 to 25; 2 = 26 to 50; 3 = 51 to 75; 4 = 76 to 100; 5 = 101+

Table 11: Results of the plant macrofossil (seeds) assessment of wet-sieved bulk samples from the Adelphi Building, John Adam Street, London WC2 (Site Code: JAD14)

Sample number	Context number	Phase	Context description	Waterlogged seeds		
				Latin name	Common name	Number
36	89	9	Pit fill; base of a pit excavated higher up in the sequence	*Sambucus nigra*/*racemosa* *Chenopodium album* *Carex* sp. *Vitis* cf. *vinifera* (charred)	elder fat-hen sedges cf. common grape vine	5 2 1 1
32	67	7	Layer	*Carex* sp. *Chenopodium album* *Rumex*/*Polygonum* sp.	sedges fat-hen dock/sorrel/knotweed	2 1 1
37	95	7	Layer; animal bone, oyster shell, high organic content	*Ranunculus sceleratus* *Chenopodium album* *Rumex*/*Polygonum* sp. *Ranunculus repens*	celery-leaved buttercup fat-hen dock/sorrel/knotweed creeping buttercup	1 1 1 1
38	96	7	Layer; high organic content	*Chenopodium album* *Eleocharis* sp. cf. *Corylus avellana* nut shell *Alnus* sp. fruit	fat-hen spike sedges cf. hazelnut alder	9 1 1 1
33	76	6	Layer	*Chenopodium album* *Corylus avellana* nut shell	fat hen hazelnut	2 1
34	75	6	Layer; very high organic content.	*Ranunculus sceleratus* *Carex* sp. *cf.* Ranunculus *sp.* *Sparganium erectum* *Chenopodium album* *Ranunculus repens*	celery-leaved buttercup sedges e.g. creeping buttercup bur-reed fat-hen creeping buttercup	8 2 1 1 1 1
39	97	6	Layer; high organic content	*Ranunculus repens* *Ranunculus sceleratus* *Persicaria* sp. *Carex* sp.	creeping buttercup celery-leaved buttercup smartweed sedges	2 1 1 1
41	98	5	Layer; high organic content	*Ranunculus sceleratus* *Chenopodium album* *Ranunculus repens* *Hordeum/Triticum* sp. (charred)	celery-leaved buttercup fat-hen creeping buttercup wheat/barley	2 1 1 1
42	99	5	Layer; very organic in patches, compressed or compacted vegetation	*Ranunculus sceleratus* *Ranunculus repens* *Sambucus nigra*/*racemosa*	celery-leaved buttercup creeping buttercup elder	14 2 2

Sample number	Context number	Phase	Context description	Waterlogged seeds		
				Latin name	**Common name**	**Number**
				Chenopodium album *Lycopus europaeus*	fat-hen gypsywort	1 1
44	100	5	Layer; rich in organic matter	*Ranunculus sceleratus*	celery-leaved buttercup	1
46	154	2	Layer; earliest foreshore deposits	*Chenopodium album* *Ranunculus fluitans*	fat-hen river-water crowfoot	1 1

Results and Interpretation of the Insect Assessment

The results of the insect assessment of the four selected bulk samples are displayed in Table 12.

Sample <38> [96] (Phase 7)

This was a very poor assemblage, with only the remains of 4 taxa identified. The rove beetle *Gyrohypnus angustatus* lives in herbivore dung and decaying grasses, and the cylindrical bark beetle *Aglenus brunneus* lives in barns, stables, cellars, where it is typically found in mouldy hay and chicken manure. Thus this small assemblage appears to represent a synanthropic environment – perhaps a barn.

Sample <34> [75] (Phase 6)

This sample yielded only 9 taxa, including very abundant fly puparia, suggesting the presence or either carrion, dung, or other rotting organic materials. The ground beetle *Trechus quadristriatus* is the only real upland indicator in the fossil assemblage. It is found in dry, open, grassy uplands. The sandy banks of standing water are indicated by the presence of the water scavenger beetle *Cercyon bifenestratus.* Standing pools of vegetation-choked water are indicated by the aquatic weevil *Tanysphyrus lemnae* that feeds on duckweed. Damp marshland and the presence of herbivore dung are indicated by another water scavenger beetle, *Cryptopleurum crenatum*. The presence of herbivore dung is also indicated by dung beetles in the genus *Aphodius*. This appears to be an 'outdoor' assemblage, near standing water, but close to domesticated livestock – perhaps a paddock near a pond.

Sample <42> [99] (Phase 5)

This was the most productive sample, yielding 19 identified taxa. There were a number of wetland species identified. The ground beetle *Bembidion guttula* lives on clay-rich soil with vegetation by water where it preys on small insects. Another predator, the rove beetle *Lesteva longoelytrata*, is found on swampy, muddy shores, especially in alder carr. The water scavenger beetle *Cercyon marinus* lives in damp organic debris in marshes or by running water, and the riffle beetle *Dryops auriculatus* is found in pools, swamps, and swampy meadows.

The only natural upland habitat indicator is the weevil *Holotrichapion pisi*, which feeds exclusively on *Medicago* (burclover) and other Fabaceae.

The remainder of the fauna are all associated with dung and/or synanthropic environments. Those associated with dung include the rove beetle *Philonthus corruscus* that preys on small insects in herbivore and human dung, and also in carrion, and the dung beetles *Aphodius contaminatus* and *Geotrupes mutator*, both typically found in horse, cow and sheep dung. *Aglenus brunneus* usually lives in barns, stables, cellars, and is typically found in mouldy hay and chicken manure. Finally, the bark beetle *Hylurgops palliatus* is found under the bark of

dead conifers, including rough outbuilding beams made of pine, fir or spruce, and piles of stacked conifer firewood.

Taken as a whole, this faunal assemblage suggests a human settlement with barns and domesticated animals, situated close to a wet, vegetation-rich lowland such as an alder carr.

Sample <45> [153] (Phase 3)

This was a moderate sized sample of 12 identified taxa. Again, the presence of damp, vegetation-rich lowlands is indicated by the presence of *Lesteva longoelytrata* and *Dryops auriculatus*. Another rove beetle, *Euryusa sinuata*, is found in damp, rotting wood, especially ash and oak. Rotting oak is also the habitat of the bark beetle *Scolytus intricatus,* especially large, dead trees.

The synanthropic environment is indicated by the water scavenger beetle *Cercyon unipunctatus*, which is usually found in manure or heaps of rotting vegetation, such as rotting hay. The rove beetles *Anotylus sculpturatus* and *Philonthus corruscus* live in herbivore dung and carrion. This assemblage suggests a similar environment to that reconstructed for sample <42> [99], typical of a human settlement perhaps with barns and domesticated animals, situated close to a wet, vegetation-rich lowland (such as an alder carr).

Table 12: Results of the insect assessment of bulk samples from the Adelphi Building, John Adam Street, London WC2 (Site Code: JAD14)

Taxon	Sample			
	<38> [96]	**<34> [75]**	**<42> [99]**	**<45> [153]**
Phase	7	6	5	3
Carabidae				
Bembidion guttula(F.)			1	
Trechus quadristriatus (Schrank)		2		
Pterostichus sp.			1	
Hydrophilidae				
Cercyon bifenestratus Küster		1		
Cercyon marinus Thoms.			7	
Cercyon unipunctatus (L.)				1
Cercyon spp.	1	1		1
Cryptopleurum crenatum (Panz.)		1		
Hydraenidae				
Ochthebius sp.			1	
Staphylinidae				
Arpedium quadrum (Grav.)				
Lesteva longoelytrata(Goeze)			3	1
Euryusa sinuata Er.				1
Anotylus sculpturatus (Grav.)				1
Gyrohypnus angustatus Steph.	2			
Philonthus corruscus (Grav.)			1	1

Taxon	**Sample**			
	<38> [96]	**<34> [75]**	**<42> [99]**	**<45> [153]**
Philonthus sp.			1	
Quedius spp.		2		1
Stenus sp.			1	
Atheta sp.		1	1	
Scarabaeidae				
Aphodius cf. *contaminatus* (Hbst.)			1	
Aphodius spp.		1	2	1
Geotrupes cf. *mutator* (Marsham)			1	
Scirtidae				
Cyphon sp.				1
Dryopidae				
Dryops auriculatus (Fourc.)			1	1
Elateridae				
Ctenicera sp.			1	
Colydiidae				
Aglenus brunneus (Gyll.)	1		1	
Apionidae				
Holotrichapion pisi (F.)			1	
Apion (sensu lato) sp.			1	
Curculionidae				
Tanysphyrus lemnae (Payk.)		2		
Scolytus intricatus(Ratz.)				1
Hylurgops palliatus(Gyll.)			2	
DIPTERA				
Fly puparia indet.	4	13	5	1

Discussion

The overarching aims of the environmental archaeological assessment were to evaluate the potential of the sediments at the Adelphi Building for (1) reconstructing the past economy and diet of the site's inhabitants, and (2) the general environmental context of the site and its environs, with particular emphasis on the nature and development of the Middle Saxon waterfront at *Lundenwic*.

Column samples

The deposits recorded in the column samples consist largely of material introduced to the site artificially and dumped, either for the purpose of embanking the river or to raise and level the ground surface prior to building construction. In columns <21> and <22> (1.87 to 1.35m OD; Phase 9) the deposits represent the infill respectively of a ditch and of a pit cut into the ditch infill. They contain large amounts of anthropogenic material, chiefly items recognisable as food waste including oyster shell and bones of large vertebrates, mingled with gravelly sediment and soil. These two infill deposits are closely similar in composition which suggests that the later, pit infill is derived directly from the earlier ditch infill, or that both deposits were derived from a common source, probably nearby where human occupation and domestic activity were present.

In column <48> (1.10 to 0.60m OD; Phases 5 to 6) the dumped material, forming the infill behind a post and plank waterfront revetment (structure 169) appears to be redeposited peat with a small admixture of anthropogenic material. For the construction of a revetted embankment, peaty silt seems an unlikely and somewhat insubstantial material of choice. Moreover, a potential nearby source is not immediately obvious as the ground near to the site must have risen steeply away from the river to the level of the Kempton Park Gravel. However, it is possible that in Middle Saxon times remnants of peat beds survived on the nearby floodplain and were therefore a convenient and easily acquired source of bulk material. This raises the issue of why revetments were being constructed at all at this point in Middle Saxon times. It seems possible that they were intended to protect land and buildings on the ground rising away from the river towards and at the level of the Kempton Park Gravel or as barge bed platforms. Such land would be particularly susceptible to erosion by the River Thames because the main channel of the river here is close to the edge of the valley floor, and ground rising away from the channel would have been formed of the readily erodible London Clay.

The lower part of the sediment sequence exposed on the east side of the archaeological excavation (Section S5) and sampled as column <47> (0.66 to 0.16m OD; Phases 1 to 5), consisted of sandy and gravelly sediments deposited on the foreshore of the Thames. They all contain some anthropogenic material and are probably approximately contemporary with the Middle Saxon deposits that overlie them. It is interesting to observe that the bedload of the river at this time included gravel, seen here in context [161] and also recorded in the field in the foreshore deposits forming context [99] and [100]. The presence of bedload gravel

gives a further indication of the potential for the Thames at this time to be actively eroding the bluffs forming the margins of the floodplain, particularly in those places, such as the present site of investigation, where the main channel of the river lay close by.

In all four column samples the pollen assemblages are indicative of an open environment dominated by herbaceous taxa, with an indication of damp conditions close to the site where sedges and perhaps some of the grasses (e.g. *Phragmites australis* – common reed) were growing, along with a limited cover of wetland woodland in the form of alder. The possible occurrence of thrift in the herbaceous assemblage may indicate a saline influence at this location; however, it should be noted that this taxa is only present in sample <21> context [14]. The arboreal taxa within the assemblages are indicative of either sporadic occurrences of trees locally to the site and the presence of hedgerows, or the distant growth of woodland. Cereal pollen grains are commonly recorded together with their associated weeds, particularly in contexts [40], [42], [97] and [99], and are indicative of cultivation or crop processing and utilisation either at or nearby to the site. Many of the herbs in the assemblage may also have originated from a pastoral or meadow-type community and disturbed ground. The diatom concentrations in all but one sample from column <48> are suitable for further analysis, and might reveal very generalised information on water quality, depth and salinity related to the source area of the redeposited peat.

Bulk samples

The species represented in the Mollusca assemblages consist largely of a mixture of species characteristic of large, well-oxygenated water bodies and species characteristic of moist terrestrial habitats; such a mixture might be found on the floodplain of a large river in moist hollows subject to seasonal flooding. However, some of the species present could relate to habitats developing on the new land surfaces created by the dumping of the layers forming contexts [7], [10] and [11]. The presence of edible species in selected samples is consistent with the field evidence that these layers 'were composed principally of domestic waste, a large proportion of which was related to food supply… in the form of animal bone and oyster shell.' The seed assemblages in samples <1> to <8> and <18> (Phases 9 and 10) were composed primarily of uncharred seeds of elder and charred seeds of barley/wheat, with occasional seeds of Poaceae (grass family) and creeping buttercup. The occurrence of herbaceous taxa was limited in these samples, perhaps suggesting that they are more typical of waste deposits in which the remains of edible taxa have accumulated.

The seed assemblage in the flots and wet-sieved sub-samples from samples <32> to <46> (Phases 2 to 7 and one sample from Phase 9) was composed primarily of uncharred seeds of herbaceous taxa, including celery-leaved buttercup, fat-hen, dock/sorrel/knotweed, creeping buttercup, Apiaceae (carrot family), Poaceae (grass family), smartweed, campion/stitchwort, spikesedge, bulrush, gypsywort and sedges. Aquatic or marginal taxa including bur-reed and river water crowfoot were also present, along with tree and shrub taxa including alder, hazel, elder, blackberry and blackthorn. Charred taxa, including barley/wheat and common grape

vine, were present in selected samples. The assemblage in these samples is consistent with the results of the pollen, Mollusca and insect assessments of the column and bulk samples, indicative of a relatively damp, generally open environment dominated by herbaceous taxa, with an indication of wetter conditions nearby in selected samples. However, there are no clear indications in the seed assemblages for a saline influence at the site. The presence of charred cereal grains and weed/disturbed ground taxa is indicative of cultivation or crop processing nearby, whilst the presence of charred seeds of common grape vine is indicative of viticulture. The insect assemblages from bulk samples from Phases 3, 5, 6 and 7 were all indicative of synanthropic environments close to wet, vegetation rich ground. There were indications in all the samples of dung or fodder associated with domesticated livestock.

A total of eight taxa were identified during the assessment of the charcoal in the flot samples: field maple, hazel, oak, birch, willow/poplar, beech, Maloideae (includes hawthorn, apple, pear), and buckthorn. All the woods identified are hardwoods native to the United Kingdom, with no softwoods or alien taxa identified. The range of taxa indicates the availability of a floristically rich environment. Almost all of the tree taxa identified are those traditionally managed.

Conclusions and Recommendations

Much of the material recorded in the column samples is not in its primary depositional context, but has been brought to the site from elsewhere and dumped. This must be borne in mind with any possible radiocarbon dates from it and any further analysis of its microfossil content (pollen and diatoms) would provide only a very generalised indication of local environments in the source area. Perhaps the most interesting deposit in this respect is the material preserved in column <48> (contexts [97] and [99], which appears to have been mainly derived from a pre-existing peat bed. Further analysis of the pollen and diatom assemblages within this sample could provide evidence of the nature and origin of this peat, and perhaps an insight into the pattern of peat preservation in the Middle Saxon riverine landscape. With regard to the semi-natural waterlaid and foreshore deposits recorded in column <47>, unfortunately the gravelly and sandy nature of these deposits means that their microfossil content is likely to be sparse and its diversity restricted. No further analysis is therefore recommended on this sample.

With regards to the bulk samples, the interpretation of the Mollusca assemblages must be treated with great caution because the deposits from which the samples came comprise material, possibly from more than one source, redistributed in Saxon times in connection with building activity on the site. There is also the possibility that some of the mollusc remains relate to populations living on the site after the redistributed material was put in place. It is not possible therefore to be sure that the sample material in individual samples all came originally from the same natural depositional environment. If it did, the most likely habitat would seem to be a moist floodplain surface, which is consistent with the location of the Adelphi Building site close to the Holocene floodplain of the Thames. Because of the problems relating to the

integrity of the Mollusca assemblages, their contamination with food waste and their origin in deposits of redistributed sediment and soil, it is recommended that no further investigation of the these faunas be undertaken.

With regards to the macrofossils, additional analysis of the charcoal assemblages may determine if any of the fragments retain anatomical characteristics suggestive of silvicultural practises such as coppicing. On the basis of the diversity of the assemblages recorded here, it seems unlikely that additional analysis of the seeds will yield additional information on the nature of the redeposited peat recorded in contexts [97] and [99]; however, it is possible that analysis of the seed assemblages or insects in any features of archaeological interest may yield additional information on the nature of the environment at the time of deposition, as well as the character of agricultural practices. Additional analysis of the four samples already assessed for their insect remains is unlikely to yield any further information on the type of activities taking place at the site, or the general environmental context.

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APPENDIX 14: Leather Assessment

Quita Mould

Methodology

The leather was scanned, identified and diagnostic measurements were taken where necessary. In view of the potential importance of the find the leather was briefly recorded and working drawings made to provide a permanent record of the material prior to conservation. A brief record of the leather accompanies this assessment (Excel worksheet JAD leather register).

Condition, storage and conservation requirements

The vegetable-tanned leather is black/very dark brown in colour and is robust and in good condition; some delamination is present but this is usual for much archaeological leatherwork. The leather is wet, washed and stored in water in polythene bags closed with metal staples within a blue plastic crate. Self-sealed polythene bags would permit easier access. The leather should be kept cool and light excluded. The leather should be conserved to allow study, illustration and long term archive storage.

Summary

Approximately 50 pieces of leather were found. All the leather was recovered from the Lift Pit trench and came from contexts attributed to the Middle Saxon period, it is therefore of potential importance as the recovery of leather of this date from this country is rare (Cameron and Mould 2011:104; Mould and Richardson 2013). Leather was recovered from nine contexts [39], [67], [75], [76], [95], [96], [97], [153], and [154] principally levelling and dumping layers. A small amount of material came from Phase 2 context [154] and Phase 3 context [153], the majority from Phase 6 [75], [76], [97] and Phase 7 [39], [67], [95], [96]. Most of the leather is waste leather with a very small amount of scrap (featureless fragments with all edges torn), and comes from contexts [39], [67], [75], [76], [95], [96], [153] and [154]. Neither waste leather, both primary and secondary waste, nor scrap leather can be independently dated. This material has all the characteristics of waste leather of Roman date and unfortunately has no leather with diagnostic features found with it that can date it. On the face of it there would be little reason to think the waste leather to be anything other than residual Roman material, however, very little other Roman material was recovered from the site and none was recovered from leather bearing contexts. One must assume therefore that the leather dates to the Middle Saxon period, see below.

Context [97], a mixed dumping horizon in the south side of the trench located north of the timber structures and directly above Waterfront 4 attributed to Phase 6, contains a small quantity of shoe leather amongst the leather waste. This shoe leather includes a small length of lasting margin indicating a shoe of turnshoe construction, and two further pieces each with

small areas of seam, including one with a series of four thong slots close to a cut edge and aligned parallel to it. This an unusual configuration for the slots but there is a known late Roman shoe style, and a later medieval shoe style, that employ this.

Potential for analysis

The importance of this group of leather relies on its Middle Saxon date and it is therefore important to establish the date the leather independently if possible. It is suggested that a small number of samples be submitted for radiocarbon dating and that leather from context [97] is included. The leather in its current state (washed and wet but untreated) is suitable for radiocarbon dating (EH 2012,19) but advice should be sort to confirm this (it has been handled several times and has not been stored under any 'special conditions'). All the leather will be of interest as so little of this date has been recovered previously. The waste leather shows that leatherworking in the form of the manufacture and/or repair of leather goods was being undertaken in the vicinity at this time. Whether the tanned hides were imported or tanned locally is open to question. At this time there is no analytical test commercially available to establish the geographical origin of a hide, as far as I am aware.

The pieces of shoe from context [97] should be studied in detail to see whether a possible shoe style can be established and an independent date for the shoe style given. The grain direction may suggest the orientation of the individual pieces and the original cutting pattern of the shoe revealed. A good quality photograph of all the leather from context [97] (grain and flesh views) both before and after conservation should be provided by PCA to help enable this.

Work required

It is suggested that a small number of samples are submitted for radiocarbon dating: the samples to be selected by the project manager who has the fullest knowledge of the excavations, contexts involved and the other dating available but should include a sample from context [97] which contains the shoe fragments. The leather should then be conserved. The leather should be re-examined after conservation and any additional features noted, then the basic record, as specified in the RFG & FRG 1993, should be completed for inclusion in the site archive. The working drawings can be updated where necessary. The pieces of shoe leather in context [97] should be studied to allow the items to be categorised if possible, dated and any comparanda identified. The data can then be correlated with the site context information. A report on the leather should be prepared to inform those preparing the site narrative and for publication. The report will summarise the material and consider the assemblage in context regarding the other leather of Middle Saxon date recovered previously from London and the rest of Britain. The shoe leather should be illustrated with line drawings, the waste leather may be best illustrated by photography.

Tasks

1 PCA to select and submit leather for dating as required

2 PCA to photograph leather from context [97] (two views)

3 QM Re-examine conserved leather

4 QM Provide basic record

5 QM Study pieces of shoe from context [97]

6 QM Provide report for publication

7 QM Provide working drawings of shoe fragments if required

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APPENDIX 15: Slag Assessment

Lynne Keys

Introduction and Methodology

A very small quantity of material (2.6kg), initially identified as slag, was recovered by hand on site. For this report the material was examined by eye and categorised on the basis of morphology; additionally, a magnet was used to test for iron-rich material and detect smithing micro-slags in the soil adhering to slags. Each slag or other material type in each context was weighed except for the smithing hearth bottoms, which were individually weighed and measured for statistical purposes. Quantification data and details are given in the table below in which weight (wt.) is shown in grams, and length (len.), breadth (br.) and depth (dp.) in millimetres.

Quantification table:

	JAD 14					Adelphi Building Lift Pit Trench, WC2	
cxt	**^ identification**	**wt**	**len**	**br**	**dp**	**comment**	**pcs**
7	iron-rich undiagnostic	26					1
7	iron-rich undiagnostic	91					1
11	iron	327				passed on for x-ray	
11	iron	28					
12	cinder	8					
12	iron-rich undiagnostic	148				part of a smithing hearth bottom?	
14	iron-rich undiagnostic	216	90	65	35	part of a smithing hearth bottom?	
14	iron-rich undiagnostic	121				part of a smithing hearth bottom?	
63	30 cinder	11					
89	iron-rich undiagnostic	113					
89	smithing hearth bottom	292				fragment	1
91	iron-rich undiagnostic	150			30	fragment from smithing hearth bottom?	
95	iron	80				mostly a "ghost" imprint	
102	smithing hearth bottom	1006	115	100	60		
	Total wt = 2617g						

Discussion of the slag

Most of the iron slag was fragmentary, obviously broken by re-deposition or from being thrown about, and could only be described as undiagnostic. The diagnostic slags were produced by iron smithing, almost certainly secondary smithing. This involves the hot working (using a hammer) of one or more pieces of iron to create or to repair an object. As well as bulk slags, including the smithing hearth bottom (a plano-convex slag cake which builds up

under the tuyère hole – the hottest part - where the air from the bellows enters the hearth), smithing generates micro-slags. These can be hammerscale flakes from ordinary hot working of a piece of iron (making or repairing an object) and/or tiny spheres from bloom smithing or high temperature welding used to join or fuse two pieces of iron.

Two complete smithing hearth bottoms were present in the assemblage; some fragments are probably fragments of others. No microslags were present in the soil on slags, which implies the slags in the assemblage had been disturbed and removed from their original place of deposition after initially being discarded.

Some material present, such as cinder, can be created in any hearth and cannot be taken to represent ironworking unless displaying magnetic properties (which these did not).

Discussion by phase

Phase 5

The largest smithing hearth bottom (weighing just over a kilo) was recovered from mudflat horizon [102]. It may have been thrown in from nearby or could have been used (because of its weight) as a net sinker or something similar.

Phase 9

1.4kg of slag and other possible iron-working debris were recovered from this phase.
Two pieces of iron (passed to Marit Gaimster for x-radiography) were recovered from layer [11].

Significant features are ditch [15] which contained fragments of smithing hearth bottoms; and pits [13] and – possibly the same pit – [90]. These contained undiagnostic slags, some of which may be fragments of further smithing hearth bottoms.

Phase 10

Stony surface [7] contained some iron-rich undiagnostic slag.

Conclusions

The slag appears to be re-deposited material which had suffered damage during transit. The absence of any micro-slags from samples or in the soil adhering to slags lends support to this conclusion.

Importance of the assemblage

The slag is important in that it indicates some limited ironworking activity north of the riverfront; there is also the possibility the slag found its way here with other dumped material from further afield

Recommendations for further work

No further work is required.

APPENDIX 16: Oasis Data Collection Form

OASIS ID: preconst1-208165

Project details

Project name	Adelphi Building
Short description of the project	A watching brief on three small test pits and the excavation of a lift pit shaft, measuring approximately 3m X 4m x1.80m deep, produced an extensive sequence dated almost entirely to the Middle Saxon period. Within the trench were four lines of Middle Saxon waterfront structures which represented management along the edge of the natural bank rather than land reclamation into the channel of the Thames. The earliest timber structures are likely to date to the first half of the seventh century AD. Above this were elements of a structure, possibly parts of a timber building, had been impacted by the pits and ditches which contained considerable quantities of domestic waste.The latest Saxon layers consisted of yard or road surfaces which dated to the late 8th or early 9th centuries. Also revealed were post-medieval massive chalk and flint foundation and the remains of large postholes which probably formed part of Durham House, a palatial complex used by the Bishops of Durham.
Project dates	Start: 30-01-2014 End: 10-05-2014
Previous/future work	No / No
Any associated project reference codes	JAD 14 - Sitecode
Type of project	Recording project
Site status	Local Authority Designated Archaeological Area
Current Land use	Other 2 - In use as a building
Monument type	WATERFRONT Early Medieval
Monument type	DITCH Early Medieval
Monument type	PIT Early Medieval
Monument type	BUILDING Early Medieval
Monument type	FOUNDATION Uncertain
Monument type	FLOOR Post Medieval
Significant Finds	POT Early Medieval
Significant Finds	TILE Roman
Significant Finds	BRICK Roman
Significant Finds	COINS Early Medieval
Significant Finds	LEATHER Early Medieval
Significant Finds	GLASS Roman
Significant Finds	TIMBER Early Medieval
Significant Finds	LOOM WEIGHTS Early Medieval
Investigation	'"Full excavation"',"'Watching Brief"'

type	
Prompt	National Planning Policy Framework - NPPF

Project location

Country	England
Site location	GREATER LONDON CITY OF WESTMINSTER CITY OF WESTMINSTER Adelphi Building
Postcode	WC2N 6BJ
Study area	600.00 Square metres
Site coordinates	TQ 3041 8059 51.5086734024 -0.120624394814 51 30 31 N 000 07 14 W Point
Height OD / Depth	Min: 0.22m Max: 0.65m

Project creators

Name of Organisation	Pre-Construct Archaeology Limited
Project brief originator	CgMs Consulting
Project design originator	Richard Meager
Project director/manager	Tim Bradley
Project supervisor	Douglas Killock
Type of sponsor/funding body	Developer

Project archives

Physical Archive recipient	LAARC
Physical Archive ID	JAD 14
Physical Contents	"Animal Bones","Ceramics","Environmental","Glass","Leather","Metal","Wood","Worked bone"
Digital Archive recipient	LAARC
Digital Archive	JAD 14

ID	
Digital Contents	"Animal Bones","Ceramics","Environmental","Glass","Leather","Metal","Stratigraphic","Wood"
Digital Media available	"Images raster / digital photography","Spreadsheets","Text"
Paper Archive recipient	LAARC
Paper Archive ID	JAD 14
Paper Contents	"Animal Bones","Ceramics","Environmental","Glass","Leather","Metal","Stratigraphic","Wood"
Paper Media available	"Context sheet","Drawing","Matrices","Photograph","Plan","Report","Section","Survey","Unpublished Text"

Project bibliography 1

Publication type	Grey literature (unpublished document/manuscript)
Title	AN ARCHAEOLOGICAL WATCHING BRIEF AND EXCAVATION AT THE ADELPHI BUILDING, JOHN ADAM STREET, LONDON WC2N 6BJ
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