DOCUMENT VERIFICATION

397-411 WESTFERRY ROAD, ISLE OF DOGS, LONDON BOROUGH OF TOWER HAMLETS

AN ASSESSMENT OF AN ARCHAEOLOGICAL EVALUATION AND WATCHING BRIEF

Quality Control

Pre-Construct Archaeology Limited			K1406
	Name & Title	Signature	Date
Text Prepared by:	Denise Mulligan		January 2009
Graphics Prepared by:	Mark Roughley & Josephine Brown		January 2009
Graphics Checked by:	Josephine Brown	pp CM	January 2009
Project Manager Sign-off:	Chris Mayo	CM	January 2009

Revision No.	Date	Checked	Approved

Pre-Construct Archaeology Ltd
Unit 54
Brockley Cross Business Centre
96 Endwell Road
London
SE4 2PD

AN ASSESSMENT OF AN ARCHAEOLOGICAL EVALUATION AND WATCHING BRIEF ON LAND AT 397-411 WESTFERRY ROAD, ISLE OF DOGS, LONDON BOROUGH OF TOWER HAMLETS

SITE CODE: WYM 07

CENTRAL NATIONAL GRID REFERENCE: TQ 3764 7853

Written and Researched by Denise Mulligan

Pre-Construct Archaeology Limited, January 2009

Project Manager: Chris Mayo

Commissioning Client: CgMs Consulting on behalf of Glenkerrin UK Ltd

Contractor: Pre-Construct Archaeology Limited
Unit 54
Brockley Cross Business Centre
96 Endwell Road
Brockley
London
SE4 2PD

Tel: 020 7732 3925

Fax: 020 7732 7896

E-mail: cmayo@pre-construct.com

Website: www.pre-construct.com

CONTENTS

APPENDICES

ILLUSTRATIONS

PLATES

1 ABSTRACT

1.1 An archaeological watching brief and evaluation was conducted by Pre-Construct Archaeology Ltd. at the former Millwall Iron Works at Westferry Road on the Isle of Dogs (Figure 1), in advance of redevelopment of the site for residential housing. The site retained an industrial Grade II listed building known locally as The Forge. CgMs Consulting commissioned the work on behalf of Glenkerrin UK Limited.

1.2 The archaeological works were conducted in two phases (Figure 2). Phase 1, which covered the areas of the site external to The Forge and the excavation of two evaluation trenches, was undertaken between March and July 2007. Phase 2 was conducted during June-July 2008 and covered the excavation of 28 pile pit locations, two access ramps and one service trench inside the perimeter of the Forge. Ground contamination rendered two small areas of the site unsuitable for investigation; these were remediated prior to the commencement of archaeological works.

1.3 Natural sand and gravels were recorded at a height of -1.18m OD to the north of the site and rising to -0.28m OD to the south, suggesting a downward slope to the north away from the river Thames. The gravel was sealed across the northern and eastern parts of the site by up to 0.70m of peat which has been dated to between the Late Neolithic/Early Bronze Age to the Middle Bronze Age. This in turn was sealed by c.1.50m of alluvial deposits. No evidence of human exploitation, occupation or artefacts dating to before the 18th century was recovered from the site.

1.4 The archaeological investigation revealed evidence of the 19th and 20th century structural development of The Millwall Iron Works, which by the end of the 19th century incorporated heavy industrial processes. The earliest construction on site took place in the mid 19th century when it was first used as an Iron Works associated with iron shipbuilding, most notably Brunel's Great Eastern. Investigations revealed that the site was developed to accommodate elements of at least two aisled workshops during its earliest structural phase.

1.5 The next phase of activity included the addition of two new structures to the site. One of these was a large double-height workshop, which remains extant on site as a Grade II listed structure, The Forge. The addition of a smaller workshop to the east closed off a previously open area between the early north and south structures.

1.6 The site retained the same structural footprint from the late 19th century to the mid to late 20th century, with the addition of some external elements which included an hydraulic accumulator, the remains of which were recorded during the watching brief.

1.7 The 20th century saw the reconfiguration of the site with the addition of a small building at the southeastern corner in the 1920s-30s, and the demolition of a large structure in the northern half and its replacement with a new workshop (1940s-50s).

2 INTRODUCTION

2.1 An archaeological investigation was undertaken by Pre-Construct Archaeology Ltd on land adjacent to and containing The Forge, Westferry Road, London Borough of Tower Hamlets (Figure 1). PCA's investigation comprised the following elements:

- The evaluation of two trenches;
- A watching brief during the removal of hard-standing across the majority of the site;
- Archaeological excavation of remains revealed beneath areas of hard standing across majority of the site;
- An archaeological watching brief during pile probing works inside The Forge (in this report these trenches are referred to with the prefix 'PP');
- An archaeological watching brief during excavations within The Forge for two access ramps (in this report these trenches are referred to as 'NW ramp' and 'SE ramp').

2.2 'The Forge' is a Grade II listed structure and has been retained for the new development; all other structures on site were demolished in line with planning consent. Prior to and during the demolition CgMs undertook a programme of historic building recording. The results of that exercise will be reported separately (Jon Lowe, forthcoming).

2.3 PCA was commissioned for the project by CgMs Consulting on behalf of Glenkerrin UK Ltd. David Divers of English Heritage, Archaeology Advisor to the London Borough of Tower Hamlets, monitored the fieldwork.

2.4 The land under investigation is the corner plot at the junction of Westferry Road to the south and Harbinger Road to the west. The site is bordered by properties fronting Hesperus Crescent to the north and Tyndale Court to the east. The site is approximately level at a height of 2.20m OD. The site lies within the floodplain of the River Thames, with the northern bank of that river lying 200m to the south of the site.

2.5 The archaeological works were conducted in two phases (Figure 2). Phase 1, which covered the areas of the site external to The Forge and the evaluation trenches, was undertaken between 28th March 2007 and 31st July 2007. Phase 2, which covered the work inside The Forge, was conducted from the 27th June 2008 to the 30th July 2008.

2.6 All work was undertaken in accordance with approved specifications (Hawkins 2007, Gailey 2007b and 2008)

2.7 In referring to the different structures which were found during the work, this report uses terminologies developed by Jon Lowe of CgMs during the historic building assessment, in conjunction with archaeologically issued structure numbers (where remains were found), as follows (see Figure 3 for relative locations):

- Structure A: The Northern Workshop, now demolished. Originally part of the Russell works expansion to the north of Westferry Road, dating from c.1848. Archaeological structure number [810].
- Structure B: The Forge, built 1860. This structure comprises two parallel halls with outer brick walls and gables. The building has non-original internal travelling cranes and timber gantries, under a 20th century steel framed roof. Archaeological structure number [811].
- Structure C: Conjoined Workshop, built in 1860, as the conjoined workshop smithy. It formed a smaller rectangular shed. Archaeological structure number [812].
- Structure D: 1935 to 1950 single storey workshop, which sits on the site of the former Southern Workshop, which was built in the 1850s. Archaeological structure number [813].

  In this report Structure D is used to refer to the Southern Workshop which was exposed in the archaeological record. The Historic Building Assessment of the site (J. Lowe forthcoming) will refer to Structure D as the later building.
- Structure E: Machine shop built, in 1939. Large two-range open plan steel framed shed with travelling cranes and concrete floor
- Structure F: Offices & Workshop, built c.1950. Concrete framed structure, with a brick infill over two storeys.

2.8 Dimensions given in this report for Structures A, C, D, E and F as revealed during the works are approximate, owing to the fact that the northeast and southeast site boundaries are not believed to be a true reflection of the boundary of the ironworks during its lifespan. The exposed archaeological remains for these structures, therefore, are conjectured and continued beyond those boundaries.

Figure 1
Site Location
1:20,000 at A4

Figure 2
Areas of archaeological investigation
1:800 at A4

Figure 3
Structures and Pile Pit Locations
1:400 at A3

3 PLANNING BACKGROUND

3.1 Archaeology in the London Borough of Tower Hamlets and the Unitary Development Plan

3.1.1 The study aims to satisfy the objectives of the London Borough of Tower Hamlets, which fully recognises the importance of the buried heritage for which they are the custodians. The Borough's ' Unitary Development Plan' (UDP) (adopted on the 2nd December 1998) contains policy statements in respect of protecting the buried archaeological resource.

3.1.2 The proposed development of the site is subject to the Council's Archaeology Policy, outlined in Chapter 2 of the UDP:

ARCHAEOLOGY AND ANCIENT MONUMENTS

DEV42 Development, which adversely affects nationally important archaeological remains, including scheduled ancient monuments, will not normally be permitted.

DEV43 Development which affects any locally important archaeological site or remains, including industrial archaeology, may be permitted depending upon:

- The importance of the archaeological remains;
- The need for the development; and
- Measures proposed for the protection, enhancement and preservation of the site and the interpretation and presentation of the remains to the public.

DEV44 The permanent preservation in situ of nationally important remains will normally be required. Preservation of other remains will be a preference, subject to the importance of the remains and the need for development of the site. Where preservation is not appropriate, excavation and recording may be required. Development of archaeological sites should adopt suitable design, land use and site management to achieve these ends.

DEV45 Proposals involving ground works in areas of archaeological importance or potential, shown on the proposals map, or concerning individual sites notified to the council by English Heritage or the Museum of London will be subject to the following requirements:

- Within areas of archaeological importance applicants will need to demonstrate that the archaeological implications of the development have been properly assessed. A written assessment (archaeological statement based on the professional advice of an approved archaeology consultant or organisation should be submitted as part of the documentation required for a complete planning application;
- Within areas of archaeological importance, the council may request, where development is likely to affect important archaeological remains, that an archaeological field evaluation of the site is carried out before any decision is made on the planning application;
- Where the preservation of archaeological remains in situ is not appropriate, the council will seek to ensure that no development takes place on the site until archaeological investigation, excavation and recording has taken place by an approved archaeological organisation;
- In appropriate cases the council will seek to ensure that adequate opportunities are afforded for the archaeological investigation of sites, before and during demolition and development. Suitable provision should be made for in situ preservation of remains (DEV44) and finds in the original location, or for removing them to a suitable place of safekeeping.

3.1.3 Within the southern boundary of the site is a Grade II listed Building, The Forge. There are no Scheduled Ancient Monuments within the development site.

4 GEOLOGY AND TOPOGRAPHY

4.1 GEOLOGY

4.1.2 The site lies within the floodplain of the River Thames with the northern bank of that river lying 200m to the south. The British Geological Survey of England and Wales (Sheet 270: South London) shows the geology of the study site as alluvium over river gravels.

4.1.3 Two geotechnical investigations at the site (WSP Environmental 2001; Southern Testing Environmental & Geotechnical 2006) confirmed the typical geological sequence as sands and gravels overlain by a layer of peat, which is sealed by a complex sequence of alluvial clays and silts, overlain by made ground:

- The gravel was recorded at fairly constant heights of c.-0.7m OD across the southern part of the site and between c.-0.7to -0.9m OD in the northeastern part of the site, but it dropped off in the central part of the site to heights of between c.-1.3 to -1.8m OD. It has been suggested that this represents a natural channel, apparently running across the site roughly east-west.
- Peat was present only in the eastern and northern central part of the site. It varied in height between c.-0.50m OD in the southeast corner of the site to c.-0.70m OD in the northeast corner, apparently rising to the west in the northern part of the site where it was recorded at c. -0.2m OD. The peat was between 0.10-0.20m thick along the eastern part of the site becoming thicker to the west along the northern boundary of the site where it was up to 0.60m thick.
- The alluvium was revealed across the site and varied in thickness between 1.20-2.25m with it thinning out towards the north and west. It varied considerably in height between c.+1.65m in the northeast to +0.50m in the southeast of the site which presumably reflected the levels of truncation across the site.

4.1.4 During the recent archaeological investigation the natural geology was only encountered in the two evaluation trenches located on the eastern side of the site (Figure 2). Natural gravel was recorded at a height of -1.18m OD in Trench 1 to the north and at -0.28m OD to the south in Trench 2. In both trenches the gravel was sealed by peat recorded at a top height of -0.38m OD in Trench 1 and and at -0.08m OD in Trench 2. The peat was seen to be much thinner in Trench 2 (0.28m thick) than in Trench 1 (0.7m thick). The top and bottom of the peat was subject to radiocarbon dating which produced calibrated dates for the base of 2470-2200 cal BC and the top of 1630-1450 cal BC, which placed the build up of the material in the Late Neolithic to Middle Bronze Age (see Appendix 5). The peat was covered by alluvium which was revealed to be 1.48m thick in Trench 1 with a top height of +1.12m OD and 0.92m thick in Trench 2 at a top height of +0.92m OD. Within The Forge (Structure B) alluvium was revealed in a number of pile locations at top heights of between +0.95 to +1.5m OD.

4.1.5 The levels from the archaeological trenches appear to be at variance with those from the geotechnical investigations, especially with regard to Trench 2, but would seem to suggest a gradual slope of the natural geology down towards the north of the site. This may suggest a build up of standing water to the north, creating the thicker peat deposits recorded in the northeast of the site.

4.2 TOPOGRAPHY

4.2.1 The site is on relatively flat ground and capped with concrete, approximately 0.30m thick and at a level of 2.20m OD. The site lies within the River Thames floodplain, the northern bank of which lies 200m to the south of the site.

5 ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

5.1 General

5.1.2 It is likely that the site lay underwater or was marshland during the prehistoric period and it was not until the medieval period when a process of reclamation was undertaken. However development did not take place on the site until the 19th century. The archaeological and historical background has been covered in depth in a previous report (Gailey 2007a), the following is a summary of that information.

5.2 Prehistoric

5.2.1 As early as the mid 19th century, the remains of a buried forest were recorded immediately south of the Millwall Lower Dock. Such remains were originally thought to be of Palaeolithic date, but more recently, radiocarbon dating has suggested a Neolithic or Bronze Age date to be more likely (Boyer 2007). Bronze Age activity was found both at Atlas Wharf in the form of a timber platform c.650m to the northwest of the site and at Mudchute with a trackway c.500m to the east.

5.3 Roman

5.3.1 No finds of Roman date have been recorded within a 500m radius of the site. In situ Roman activity has only recently been identified on the Isle of Dogs, to the west of the West India Docks, in an area where the natural gravels are high.

5.4 Anglo Saxon and Early Medieval

5.4.1 No evidence of Anglo-Saxon or early medieval activity in the vicinity of the site has been found. The site is remote from settlements of these periods. The site lay between the medieval river defences at Poplar High Street and the River Thames. It is likely to have been an area comprised of salt marsh. It is also highly probable that for a significant proportion of these periods the site may well have been submerged by the tidal River Thames.

5.5 Post-Medieval

5.5.1 Development to the south of Westferry Road was begun in 1836 with the erection of William Fairburn's works. Development on the north side of Westferry road did not start until the late 1830s with the construction of the Glengall Arms, 367 Westferry Road and some cottages.

5.5.2 In 1846-47 the Millwall British School was constructed in the southwestern quarter of the site. Bombing during the Second World War severely damaged the school, which was pulled down.

5.5.2 It is during the period from 1854-60 that the first workshops were constructed on the site (Aldsworth 2003). During this period the site is documented as being the site associated with the construction of the Great Eastern Steam Ship, conceived and designed by Isambard Kingdom

Brunel and built in partnership with John Scott Russell. J S Russell went into receivership in 1859 and the works became the property of his bankers (RCHME 1994).

5.5.3 Charles Joseph Mare occupied the site around 1859-1860. Mare extended the workshops and was responsible for the construction of the Forge (Structure B / [811]), which is still extant on the site and now a Grade II listed building. He also built the conjoined workshop (Structure C/ [812]). In 1872 the Millwall Iron Works and Ship Building & Graving Docks Company Ltd was forced to close because of spiralling debts (Spackman et al, undated). The works ceased production and large plant and machinery were sold off (Barry 1863).

5.5.4 The works was leased in 1874 to Philip Edward Sewell and Samuel Gurney Buxton. In 1884 Samuel Gurney Buxton leased the property to Joseph Westwood; contemporary documentation in the form of an indenture dated 1889 shows that the site contained a planing shop (structure D/ [813]), a smithy (Structure B/ [811]) and Structure C/ [812], and a boilermakers shop, pattern stores and stables (all in Structure A/ [810]).

5.5.5 This schedule is repeated in the lease between Maconochie Bros and Joseph Westwood dated October 1912, suggesting the fittings had not changed substantially by then.

5.5.6 Joseph Westwood and Company Limited carried out alterations to the premises during their continued occupation of the site until the 1950s. The works remained in use for steel fabrication and stockholding into the 1990s.

6 ARCHAEOLOGICAL METHODOLOGY

6.1 The watching briefs and evaluation followed methodologies specified in the various specifications for the site (Hawkins 2007; Gailey 2007b & 2008).

6.2 An archaeologist monitored ground-invasive machining across all areas of the site except those which required remediation due to ground contamination. Two areas at the southwestern and southeastern corners of the site required such action (both shown outside of the Phase 1 & 2 areas on Figure 2). In other areas, a 360° tracked machine fitted with flat-bladed buckets completed the majority of groundwork. However, given the nature of the ground, i.e. with a great deal of concrete and made ground, the machines were occasionally fitted with toothed buckets. Such work was closely monitored, and the machines re-fitted with toothless buckets once the ground conditions permitted it.

6.3 The recording primarily consisted of a detailed watching brief of the 19th and 20th century structural remains of the site, which were all present at approximate current ground level. In addition two evaluation trenches were excavated by machine using a flat bladed bucket to allow the investigation of the site's underlying soils and to allow environmental sampling / analysis (Figure 2).

6.4 Within The Forge, a series of pile-probing pits were excavated (Figure 3), all of which were archaeologically monitored. These were all broken out by machine and then monitored closely as excavation proceeded. Archaeologists took over the excavation if and when remains were found.

6.5 Recording was undertaken using the Museum of London single context recording system as specified in specifications. The majority of the recording work carried out on site was surveyed in 3D using a Total Station. However, detailed plans were drawn at a scale of 1:20, and full or representative sections at a scale of 1:10. Contexts were numbered sequentially and recorded on proforma context sheets. Levels were taken from a temporary benchmark traversed on to the site by an engineer working for the main contractor.

6.6 A full photographic record, including black and white prints, colour transparencies and digital shots, was maintained throughout the investigations

6.7 The completed archive comprising written, drawn and photographic records and artefactual material will be deposited at the London Archaeological Archive and Research Centre (LAARC) under the site code WYM07.

6.8 The archaeological results have been assessed and presented in this report using a combination of the stratigraphic information obtained from the site and historical maps and documents for the area, in order to best phase the archaeological sequence.

7 ARCHAEOLOGICAL SEQUENCE

7.1 PHASE 1: Natural Deposits (Figure 4)

7.1.1 The natural gravels in Trench 1 to the northeast were not reached because of rising ground water flooding the trench; however a level on the top of the sand in Trench 1 was recorded at -1.18m OD. Natural grey sandy gravels, [18] and [237], seen in Trench 2, were recorded at a level of -0.28m OD, located to the southeast of the site. The difference in these levels seems to suggest a natural slope down towards the north of the site, and a rise towards the river Thames, in the natural underlying geology. This may be the result of a naturally occurring sand and gravel bank created by a large meandering of the River Thames to the south. No features or dating evidence was recovered from these natural deposits.

7.2 PHASE 2: Peat Deposit (Figure 4 & Plate 1)

7.2.1 A layer of peat [17] and [236] was seen in both of the evaluation trenches, sealing the natural sandy gravels. These sediments most likely indicate the transition from a moderate to high-energy fluvial system to semi-terrestrial peat formation. This transition may have been brought about by either a decrease in the rate of relative sea-level rise, or by a change in local factors, such as the natural lateral migration away from the site of a river channel creating a back-swamp area (see Appendix 5).

7.2.2 To the northeast of the site in Trench 1, the peat was 0.70m in thickness and was recorded at a level of -0.38mOD. In Trench 2 to the southeast of the site, the peat was 0.28m thick and recorded at a highest level of -0.08mOD. The thinning of the peat towards the south reflects a rise in the natural gravels and may also suggest that the study site lay on the edge of a salt marsh during the Late Neolithic / Bronze Age (see Appendix 5). No evidence of human exploitation, occupation or artefacts was found within the peat deposits.

7.2.3 Radiocarbon dating of the top and bottom of the peat in Trench 1 indicate that the peat formation commenced sometime prior to 2470 to 2200 cal BC (4420 to 4150 cal BP), during the Late Neolithic/Early Bronze Age cultural period, and continued after 1630 to 1450 cal BC (3580 to 3400 cal BP). The transition to semi-terrestrial conditions with peat formation during the Late Neolithic/Early Bronze Age was a response to changing environmental conditions, possibly a change in the proximity of the main river channel, and a decrease in flood amplitude and frequency, resulting in peat formation in extensive, low-lying areas. This is corroborated by the archaeological evidence, which shows the underlying gravels sloping down towards the north of the site. Environmental assessment of the peat deposits supports a local salt marsh environment with alder woodland. The pollen and plant macrofossil data support this interpretation with evidence for a rich wet woodland plant community comprising alder, most likely forming fen carr, with an understory of sedges and grasses growing on the peat surface. On nearby dry land, oak

and lime woodland with occasional elm dominated the vegetation cover, although the presence of shrub land suggests that areas of less dense woodland also existed (see Appendix 5).

7.3 PHASE 3: Natural Features (Figure 4 and Plate 1)

7.3.1 Cutting the peat in Trench 2 were two features, [239] and [243]. The former feature is likely to have been a naturally occurring tree throw. The latter was interpreted as a small and shallow naturally channel running towards the River Thames. It had a width of at least 1.5m and passed through Trench 2 for a distance of at least 2.6m. It was 0.49m deep from a maximum height of -0.06m OD.

7.4 PHASE 4: Alluvial Deposit (Figure 4)

7.4.1 A layer of alluvium was present across the site and recorded as [15] and [16] in Trench 1 and [235] in Trench 2. The alluvium was a maximum of 1.48m in thickness with a top height of +1.12m OD in Trench 1 and 0.92m thick in Trench 2 at a top height of +0.92m OD. To the west within Structure B alluvium was revealed in a number of pile locations at top heights of between +0.95 to +1.5m OD. The layer was divided into two deposits in Trench 1, [16] and [17], for the purpose of environmental sampling. This layer is the result of reoccurring tidal flooding of the area.

7.4.2 The alluvium was sealed with approximately 1m thickness of made ground, which was observed across the extent of the site and was no doubt deliberately laid in order to level it.

7.5 PHASE 5:1848-1859 (Figure 5)

7.5.1 This phase consisted of the period of occupation of the site by J S Russell, during which time at least two workshops were constructed. The remains of wall footings for two structures, A (the northern workshop) and D (the southern workshop) were recorded. Structure A is attributed to *c*1848, while Structure D was built in the 1850s.

7.6 Structure A: Superstructure

7.6.1 The main body of Structure A was seen to measure approximately 24m NE-SW by approximately 52m NW-SE and was defined by the foundations of the outer walls to the north, and a low sleeper wall to the south.

7.6.2 The northern wall of Structure A, [1] & [9], was of brick construction with evenly spaced buttress facing externally north. The wall was 0.36m in width extending to 0.48m at the buttresses and ran in a NW-SE direction for at least 24m, with the buttresses being evenly spaced at 2.10m apart. The wall continued into the limit of excavation at the eastern end, whilst the western end was completely truncated.

7.6.3 A fragment of NE-SW aligned wall [419], constructed from red and yellow stock moulded bricks, has been interpreted as the western wall of Structure A. The wall was 0.30m thick, 1.90m in

length and only recorded at its southern end; no continuation of the masonry was found to the north. It survived to a height of 1.81m OD.

7.6.4 The construction of the southern wall of Structure A, [83] & [409], comprised of a low sleeper wall constructed using the same red and yellow stock moulded bricks as the north wall. It had two cast iron stanchion bases, [81] & [425], set on top of the sleeper wall, which would have held vertical timber uprights (Figure 7). The stanchion bases were slightly smaller in size than those which make up the aisles of the workshop (see below), being 0.48m long and 0.28m wide, with the socket being 0.16m square. The stanchion bases were only recorded on the southern wall of Structure A (Plate 5). The sleeper wall was recorded at a height of 1.53m OD. This wall may have possibly had a weatherboard cladding to the south, or else it was perhaps open-sided on that façade.

7.6.5 Walls [6] and [11] were aligned NE-SW and were located perpendicular to wall [1] / [9]. The walls were built using the same type brick as wall [1] / [9], with the same buttressed brickwork construction. The archaeological relationship between walls [6] and [1] / [9] was lost, as the southern end was truncated by 20th century concrete intrusions. A 5.25m long by 0.25m wide possible partition wall [13] abutted the eastern side of wall [11]. The wall was associated with two large timbers which may be the remains of floor joists. As the nature and construction of walls [1] / [9], [6] and [11] were of striking similarity it is likely this may have been either an integral part of the original building or was added within a few years of construction as an extension to the main workshop.

7.6.6 Structure A was identified as an aisled workshop by the discovery of three cast iron stanchion bases [28], [50], and [57] running parallel to its northern wall, offset by approximately 5.0m. These were spaced at intervals of 8.0m, and they would have held timber uprights measuring 0.35m by 0.35m. A brick base [46], which may have held a cast iron stanchion, was recorded as part of the same alignment. The stanchions sat at approximately floor level, at a height of 1.47m OD. No stanchion bases were found surviving to define an aisle parallel to the southern wall.

7.6.7 The floor surfaces within Structure A were comprised of beaten earth floors which lay directly over the underlying alluvial clay and made ground, and were covered in a metalled surface. These, [96] and [120], are likely to have been formed by a build up of hot metal shavings; the floor surface was recorded at a level of 1.50m OD.

7.7 Structure A: Internal Features

7.7.1 In the northern part of Structure A, 0.60m south of the northern wall [1], four D-shaped brick structures [31], [32], [33] and [38] were recorded which ran in an NW-SE direction respecting the line of the northern wall (Figure 5 and Plate 2). The features had been backfilled with demolition rubble. One feature [38] was fully excavated and was cut from the top of the alluvium. The features were interpreted as blacksmiths' hearths. A level of 1.50m OD was recorded on the top of the masonry whilst the alluvium base was at a level of 1.00m OD. Hearth [38] measured 1.1m

by 1.2m and was built using mostly header courses. A small truncated length of cast iron pipe [58] with a diameter of 0.17m and associated with the structures ran along the north wall in an NW-SE direction at the back of the structures.

7.7.2 Close to the southern wall of Structure A were two features [418] and [410] associated with the earliest phase of construction of the building. They are recorded as a pair of furnaces with the latter being the only one fully excavated. They were constructed side-by-side and aligned in a NE-SW direction. Furnace [410] was located to the west of [418] and both were of similar size and keyhole-shape, with the wider rounded end to the south and a narrower flue headed in a northeast direction (Figure 8). The secondary fill was mostly rubble but the primary fill was a charcoal and ash deposit, which is clearly related to a working furnace. Structure [410] measured 2.20m NE-SW and 2.80m NW-SE. The internal area of the furnace at the southern end had mortared sides, giving it a dish-like shape. They were constructed using a mixture of kiln bricks and hand made red and yellow bricks dated pre-1850. The internal edges of the flue were of stepped construction, with a floor at 1.01m OD of at least two courses of brick (Plate 3). A small alcove or niche was set into southern end of the furnace, possibly for access, to the south of which was a brick floor [411] recorded at a height of 0.94m OD.

7.7.3 A number of timber planks [25], [27], [51] and [52] were exposed which were interpreted as ground consolidation for items at floor surface level and were recorded at a height of 1.30m OD. Two cut features [45] (with associated timbers [54] & [55]) and [30] (with associated timbers [36] & [37]) were recorded atop the industrial metalled floor surface in Structure A. They were relatively shallow and appeared to have heavy beams placed along the sides. They are likely to be areas where large pieces of machinery once stood.

7.8 Structure D: Superstructure

7.8.1 Structure D was shown to be an aisled structure by the presence of nine cast iron stanchion bases, four in the north of the workshop [206], [211], [212], [264] and five [110], [149], [150], [151], [267] in the south (Figure 6). However, it is likely there were originally at least six stanchions per aisle, as one concrete pier base to the south, [119], remained with no stanchion base in place. They were offset from the external walls by approximately 4.0m, and positioned at intervals of approximately 5.0m.

7.8.2 Structure D covered an area of approximately 22m NE-SW by 29m NW-SE. Two parallel wall footings [103] and [104] approximately 1.50m apart survived at the south of this structure. Both walls were aligned NW-SE and constructed using red and yellow bricks which were dated to 1770-1850. A brick culvert [105] was seen was located between these two parallel walls and also aligned NW-SE. It was seen to continue as context [731] in the SE Ramp Trench to the northwest. Context [104] was constructed of a single width of stretchers, however the brick footings from [103] were more substantial. The location of the culvert [105] between the two walls clearly makes them contemporary. The question what purpose the culvert was serving, for

example to remove foul water from the site or as part of the rainwater recycling system which is thought to have been used at the works (see para 7.15.2 below), is still subject to debate.

7.8.3 The metal stanchions had squared sockets for timber uprights, 0.35m by 0.35m.The stanchions sat on brick bases, which were set below the floor level and were recorded when they were later removed by machine The base of the stanchions were recorded at a height of 1.47m OD and appeared to sit at floor level.

7.8.4 The floor surfaces within Structure D were comprised of beaten earth floors which lay directly over the underlying alluvial clay and made ground, and were covered in a metalled surface at a level of 1.50m OD.

7.9 Structure D: Internal Features

7.9.1 The remains of a flue / furnace were identified in Structure D. It was constructed using a mix of yellow stock bricks and kiln bricks, which showed visible evidence of intense heat/burning. Brick samples from this structure were dated on form and fabric between 1780-1850.The brick furnace/ flue comprised context numbers [146], [147], [148], [175], [177], [178], [183], and [268]. It was allocated a structure number [263]. The flue/furnace was located in the southern part of Workshop D and was aligned NW-SE parallel to the southern wall of the building. The highest level taken on the top of this structure was recorded at a level of 1.67m OD and the lowest level taken on the internal floor was at 1.22m OD. Structure [263] was constructed with very thick stepped outer walls, with a complete width of 2.90m NE-SW. The total length of the exposed remains [263] was approximately 8.50m NW-SE. It had the remains of an arched roof, sealing a shallow channel 0.35m deep, with a loose brick floor.

7.9.2 An unusual feature seen to the north of the central aisle in Workshop D, comprised a long flat-topped wrought iron box-like structure [198], with low brick sides [199] used to support the wider top. This feature sat on the top of the underlying alluvium, with a tapering end at the east firmly embedded into the upper alluvial deposits. The top of this metal platform was secured using large flat wrought iron plates riveted together. The underside of this structure revealed a hollow interior with a series of riveted wrought iron plates to provide lateral support. The top of the platform sat at floor level in this area, at 1.42m OD, and was aligned NW-SE. It was in excess of 9m in length and 0.72m in width. This metal structure respected the original alignment of the workshop with three of the stanchions [264], [206] and [211] all located to the north of it. The purpose of this structure in its position on the site is at present unknown. It has been suggested that rather than having being built for a specific purpose within Structure D, it may have been 'recycled' from elsewhere. For example, it is possible that the shape and construction of the item may identify it as being from a ship, as some type of strut or hull support (M. Tucker and J. Lowe, pers comm.).

7.9.3 Several large blocks of stone were located around the workshop area. The largest was a sub-rectangular block of York sandstone [107] in the northeast corner of Structure D. The stone had the remains of machine fixing bolts still in situ. The entire stone was raised above the floor level

by 0.40m and recorded at a level of 1.89m OD. Its dimensions were recorded as 2.68m NW-SE and 2.82m wide at its northern end, narrowing to 1.30m at its southern end. The block was set into a red brick base [140], and undoubtedly formed a setting for machinery in the workshop.

7.9.4 To the south of [107] another sandstone block [109] was located. This was rectangular in shape and was set at 1.46m OD, approximately level with the floor. It had a shallow square socket at the centre measuring 0.28m square The dimensions of the sandstone measured 1.55m NE-SW by 0.60m NW-SE by at least 0.35m thick. This was also some form of machine base.

7.10 External Features

7.10.1 In PPs 71-73 another industrial surface was seen in section which is dated to Phase 5. The surface [582] comprised a metalled surface at 1.34m OD. This location, outside of Structures A and D, makes this an early external surface for the works. The same applies to surface [528], recorded in section at 1.41 m OD in PPs 56-58.

7.10.2 To the west of the furnace [410] a rectangular brick structure [401] was interpreted as a quench tank (Figure 8). It was constructed using red and yellow hand made frogged bricks, and was cut from the top of the alluvium; the feature was aligned in an NE–SW direction. The internal brickwork of the tank was lined with clay, which made it watertight. Its dimensions were 2.74m by 1.58m by 0.39m deep. The highest level recorded on the tank was 1.46m OD and the lowest level, which was taken on the base inside, was at 1.07m OD. The location of the tank and furnace appears to place them outside the footprint of the Structure A. While no evidence of any walls was recorded to the west of these features it is entirely feasible that they may have been housed in an open sided structure.

7.10.3 A number of features were found during the pile probing work inside the Forge, which are included in this phase owing to the dating of their composite materials. Their positions, however, place them externally to Structures A and D.

7.10.4 In PPs 7-9, a square brick manhole [730] was recorded in the northeast corner of the trench, covered by a large wrought iron plate [711]. When removed it revealed a brick construction with an arched drain that ran in an NW-SE direction. The remains of a large timber beam [712] lay to the west of the manhole. The complete structure including the timber was covered in re-deposited clay. It was located at a height of 1.0m OD.

7.10.5 In PPs 47-49 the remains of a circular concrete base [539] with associated brickwork on top was recorded and interpreted as a turntable / crane base. The base continued beyond the limits of excavation and therefore its meaningful dimensions are unknown. This base appears to pre-date the construction of Structure B. No available historical records at the time of writing show such a feature in this position.

7.10.6 In PPs 74-76 a rectangular red brick feature [476] was revealed of which only the northwest end was exposed. The top of the feature sloped down towards the east. The use of this structure is unknown as not enough was seen to form a reliable interpretation.

7.10.7 Within PPs 77-85 the remains of a curving brick structure [465] with two separate chambers was interpreted as a flue. A single width brick partition wall divided it into two chambers, which had brick floors at different heights. The structure was well constructed using red and yellow bricks which have been dated from 1830 to 1850, and was in a good state of preservation.

7.10.8 In PPs 59-61 the remains of a timber drain (structure [642]) were recorded. The drain was constructed using two parallel timber beams [636] and [637] set approximately 0.10m apart and capped with a timber plank [638]. The base of the drain sat at a height of 0.93m OD and was aligned NW-SE. It was truncated to the northwest and it continued into the section towards the SE. The feature had a width of 0.38m and was at least 1.45m long.

7.10.9 In the SE ramp trench three courses of a brick wall [764] were found, although it was truncated to both the north and the south. A similar brick wall was located to the east and may be part of the same feature. Both have been dated from 1780 to 1850.

7.10.10 A turntable or crane base [779] was seen in the NW ramp trench, located across the centre of the entrance to Structure B. The base was constructed of concrete and had the remains of timber beams inserted into slots in the concrete. It was recorded at an upper height of 1.85m OD.

7.10.11 Prior to the construction of Structure C the area between Structures A and D was open, possibly with the intention of acting as a firebreak between Structure D to the south and Structure A to the north. The remains of a tramway [93] were found in this area, seen in cartographic evidence from 1856. The remnants of the timber supports [328], [329], [352] and [353], from the rail continued to run northwest towards the northeast entrance of later Structure B. The timber supports were recorded again in the area of the later Structure B in PPs 50-52 as contexts [562], [563], [564], and [565], and in PPs 53-55 as contexts [663], [664], [665], [666] and [667].

7.10.12 Beneath the remnants of the tram rail, a brick culvert [94] was recorded aligned NE-SW, which had a small manhole located just south of the track. The culvert ran for approximately 3m to the north. The top of the culvert was recorded at a level of 1.26m OD with the lowest level recorded as 0.99m OD, although it was not fully excavated.

7.11 Phase 6: 1860-1872 (Figure 10)

7.11.1 C J Mare occupied the premises during this period and in this time alterations and additions were carried out to the existing workshops. This included the construction of Structure B, The Forge, and Structure C, also referred to as the conjoined workshop, between Structures A and D. These changes can be identified in cartographic evidence (Figure 9) and from a contemporary author who visited the site (Barry 1863).

7.12 Structure A: Superstructure

7.12.1 In Structure A the remains of two different floor areas were recorded, [53] and [64]. Context [53] comprised of wooden planks, which were laid like floorboards, covering an area of 1.8m by 2.7m,

whilst [64] was comprised of flat Yorkstone slabs, covering an area of 4.6m by 2.1m. The stone floor sat at a level of 1.36m OD whilst the timber floor was recorded at a height of 1.45m OD.

7.13 Structure B: Superstructure

7.13.1 Structural details of The Forge, Structure B, will be outlined in a separate Historic Building assessment (J Lowe, forthcoming). Upon construction in 1860 the building measured approximately 27m NE-SW by 45m NW-SE.

7.14 Structure B: Internal Features

7.14.1 In PPs 28-30 and PPs 16-18 the remains of what are interpreted as blacksmiths' hearths [602] and [692] was seen in section (Figure 11). The blacksmiths' hearths were associated with flues, which were constructed into the western wall of The Forge, Structure B. The tops of the hearths were recorded at a level of 1.96m OD with the base at 1.47m OD.

7.14.2 In PPs 71-73 an industrial floor surface [574] was recorded in section and associated with Phase 6. It comprised a mix of clay and ferrous material, and was seen at a height of 1.55m OD. The current floor height within Structure B was recorded at 2.20m OD.

7.15 Structure C: Superstructure

7.15.1 The conjoined workshop, Structure C, was located between Structures A and D and covered an area measuring approximately 14m by 30m. Wall [84] to the north and wall footings (located in three separate areas) [89], [196] and [373] to the south defined the area of Structure C.

7.15.2 The materials used in the construction of these walls were a mix of red and yellow frogged brick. The walls were aligned NW-SE and had stepped buttress footings, which sat on a bed of concrete. On the southern wall where these buttresses stepped out, the remains of two damaged circular cast-iron column supports were located. These specific features were of hollow construction, and it is thought that this allowed their use as down-pipes to harness rainwater for re-use on the site. There is evidence, from formed concrete placements, that more supports were located at regular intervals along the wall. It is interesting, if a little odd, that no evidence for these cast-iron supports were recorded on the northern wall [84], although it was of a similar stepped buttress construction.

7.15.3 The remains of a brick floor [80] at 1.48m OD, set into the metalled floor surface, was located to the northeast end of Structure C. It is considered that the use of brick for floor surfaces in this building may be because the structure contained several small offices or storage areas, a possibility further suggested by the absence of contemporary industrial features or truncations within it.

7.16 Structure C: Internal Features

7.16.1 A brick structure [427] was located in the southwest corner of Structure C, consisting of north wall [344], south wall [335] and east wall [343], and has been interpreted as a small office. The level of the internal floor surface of this structure was 1.65m OD.

7.16.2 A feature comprising [82], [223] and [224] was recorded in the northern part of Structure C. It consisted of two concrete plinths [82] and [223], each measuring 1.15m by 2.2m, which had the remains of iron fixings located on the top. Between the two plinths was a tank [224], measuring 2.4m by 1.04m and 0.47m deep, which sat above floor level at a height of 1.64m OD. During a site visit by GLIAS (25th May 2007) the tank was identified as being made of rolled steel. The feature may represent two machine bases with a quenching tank between.

7.17 Structure D: Internal Features

7.17.1 A squared grey-white, worked Coade Stone [92], which was manufactured in Lambeth (see Appendix 2) was located in the northeast part of Structure D. The stone was cut with a lower arced curve on the east face, possibly to take a grinding stone, machine belt, or pulley. The Coade stone originally had two metal fixings situated on the top. One remained *in situ* and appeared to be set in a tapered socket which had metal (possibly lead) poured into the socket to hold the fitting in place. The second had been wrenched from its socket breaking the stone when its attachment was removed. The worked stone was set into a brick floor [96] and was raised above the working floor level by 0.50m, at a height of 1.78m OD, and measured 0.60m by 1.45m. The area was enclosed by the remains of a brick wall [91], which was truncated to the west by a later structure. It possibly represents a separate room within the workshop. To the west wall [200] and brick floor [202], at 1.07m OD, may also have been part of the same enclosed area.

7.17.2 In Structure D the footings for a substantial wall [272] were located to the west. The footings were aligned NW-SE, measured at least 4.25m long by 1.95m wide by 0.60m high and were recorded at a height of 1.55m OD. This wall foundation was truncated to the west by a 20th century concrete intrusion and the eastern end of this foundation continued into the limit of excavation. Brick samples recovered from this feature were dated from 1850-1900. The wall's use or full extent remains unknown.

7.17.3 In the western end of Structure D a masonry feature [268] and [274] was seen running along the same alignment as Phase 5 flue/furnace [263] and may be a later extension of structure [263]. The relationship between structures [263] and [268] could not be confirmed. It is clear that the western end of the structure appears to be more intact with ventilated machined bricks on the upper surface. The bricks were dated 1850-1940 but the addition of clinker into the mortar puts it at a date most likely to be 1865-1880.

7.18 External Features

7.18.1 A turntable was located outside the western end of Structure A (Figure 12) at a height of 1.52m OD, although this does not represent its original level as the timbers were very degraded. It was constructed on a concrete base at 1.47m OD with a low brick circular wall and radiating timbers, which crossed each other at the centre. No evidence remained for the rails, although a series of timbers recorded initially as a wooden floor and [19], [20], [22], [23], [51] and [53] are more likely to be sleeper beams which may have supported the tramline associated with the turntable [65]. The turntable is shown on the Ordnance Survey map of 1867 (Figure 9).

7.19 PHASE 7: 1884-1940 (Figure 16)

7.19.1 This phase is associated with the occupation of the premises by J Westwood & Son, when historical and cartographic sources show that the site remained the same structurally from Phase 6 (Figures 17 & 18). During this period Structure A is first recorded as a boiler shop and Structures B and C are shown as a smithy. Structure D is identified as a planing shop.

7.20 Structure A: Internal Features

7.20.1 In Structure A a large cylindrical feature [390] was located immediately adjacent to the southern wall. It had an external diameter of 1.92m, was constructed using header courses and was found at an upper height of 1.52m OD. It was at least 2.64m deep. It had been capped with a riveted iron plate lid, identified as being re-used from a Cornish boiler (Figure 7 & Plate 5). The feature is shown on an indenture plan of the workshop dated 1889 and is described as a well (Figure 17). When the metal plate was removed it revealed two outlets / inlets at varying depths within the structure on the northeast and northwest sides.

7.20.2 Evidence of a later insertion into this structure was seen from an iron pipe [393] which ran into the well on its western side. It had been fed into the well structure via a later hole. The pipe was contained on the western side within a brick duct [389] which joined between the well and a flue [388]. The duct was capped along its length with a wrought iron plate [398]. At the junction between [389] and flue [388] a deliberate opening between the two revealed an iron plate sealing the top of the opening; in this plate an aperture was visible. The duct [389] was considered to be a later addition to flue [388], and therefore represents a potential change of use for the flue. Also, a sandstone block with a carved opening [387] was found *in situ* above [398]. The exact purpose of the flue, sandstone block, duct and metal pipe contained within is unknown at present.

7.20.3 On the north side of the well [390] was seen a large (0.4m diameter) pipe [394] running in a N-S direction, which had been blocked by the well structure; however, another opening was visible on the exterior of the well which appeared to have become defunct, as it was blocked by an iron plate. This feature provides further evidence of the change of use of the well structure.

7.20.4 To the east of the furnace [423] at the southwest corner of Structure A two single width parallel brick walls [420] were recorded aligned NW-SE and 1.38m long. The walls were only 100mm apart and formed a pipe duct, within which was seen a heavily corroded iron pipe.

7.20.5 The Ordnance Survey map of 1894 shows a tram rail running around the northern edge of Structure A and into that building at its northeastern corner. To this south of this 'entrance' point, and internal to Structure A, was found an untruncated section of tramline [21] 8m long at an upper height of 1.37m OD. The gauge of the rails was 0.52m with the contact surface being 40mm wide.

7.21 Structure B: Internal Features

7.21.1 In PPs 74-76 a brick flue [477] was recorded aligned NW-SE. The flue was badly constructed using red brick, which had suffered severe heat damage. It was capped with a number of cast iron plates of various sizes. The feature sloped down towards the east, which may be the result of subsidence. A small iron pipe [478] was recorded running across the top of this feature. The top of the feature was at 2.00m OD whilst the lowest level at the base was at 1.40m OD (Figure 15).

7.21.2 In PPs 44-46 the remains of footings for a wall [649] aligned E-W were found. The wall was 0.50m wide and was at least 5 courses high. The wall was constructed using earlier red and yellow bricks, which had been reused to construct this feature. The base of the footings was recorded at a height of 1.65m OD, while the top of the footings was at a height of 2.02m OD.

7.21.3 In PPs 4-6 the remains of a flue [680] were recorded. It was aligned E-W and was capped with cast iron plates. Above the flue, and seemingly separate, was found a stretch of brick masonry [679] which ran in a N-S direction and continued into the southern section. The structure was constructed of re-used red bricks, and some kiln bricks (Figure 14).

7.22 Structure C: Internal Features

7.22.1 In Structure C a large 300mm-diameter ceramic pipe [245] and [335] was recorded running parallel to the southeastern edge of the building before turning to follow the southwestern edge. A further stretch of pipe, although on a different N-S alignment, was found in the western end of the building and was thought to be part of the same installation. The pipe was encased in a concrete surround; this may suggest that the pipe was an important part of the works at that time and therefore warranted protection. However, it cannot be said with any confidence at this time whether this feature is a continuation of the blast pipe (see below).

7.23 Structure D: Internal Features

7.23.1 Within the eastern area of Structure D a large rectangular brick-lined pit 1.25m deep with a brick floor [213] was revealed. It comprised four rectangular plinths: [208] and [209] to the north with [232] and [233] to the south of the central brick-lined pit. The structure was built using machined red bricks dating from 1850-1950. The highest level taken at the top of this structure was

recorded at 1.78m OD, and the lowest level taken in the base of the pit was at 0.50m OD. On the eastern end of plinth [232] the remains of a cluster of corroded metal rivets were exposed. They were fused together and encrusted onto to the brickwork, suggesting that the rivets were hot when they were dropped on the plinth. This may provide a clue to the use of structure [213] and the machine above: it may have been a machine press, used for cutting rivets. This installation can clearly be seen in an indenture plan of 1889 (Figure 17), although it is unlabelled.

7.23.2 In Structure D a series of blocks [220], [225], [226], [228], and [229] were located in the western part of the building. These were made of a grey white Portland cement and were set below the floor level at a level of 1.29m OD. No evidence for metal fixings was visible on any of these bases, which had been badly damaged. They are shown on an indenture plan of the building dated 1889 (Figure 17).

7.24 Blast Pipe

7.24.1 The blast pipe was part of the integral power supply to The Forge, bringing air / draft to the machinery within from an unknown source, possible off-site to the north. Although the date of its first installation at the site is unknown, it is seen on an indenture plan of 1889 as a dashed line (Figure 17) during the tenure of Joseph Westwood. This shows it following the external sides of Structure A, except for the southeastern, but also partially continuing along its northeastern alignment into Structure C. Additionally, the Indenture Plan shows two spurs of the pipe within Structure B, one bisecting the building on a SW-NE alignment and the other running parallel to the southeast.

7.24.2 The archaeological investigation revealed pipes in various places which correspond to those shown on the Indenture Plan.

7.24.3 In PPs 71-73 the blast pipe is recorded in Section 30, where the cut [579] for the pipe [578] with a diameter of at least 0.25m is seen truncating two earlier industrial floors from Phases 5 and 6 (Figure 20). This supports the evidence that the blast pipe is clearly a later addition. This is supported again in PPs 56-58 where the blast pipe [531] (0.35m diameter) was located in the north facing section, Section 22, and is seen to truncate the industrial floor surface [528]. The top of the cut [532] for the pipe was recorded just below the existing concrete floor of the Forge (Figure 13 & Plate 4). In PPs 56-58, the pipe had a thickness of 20mm and was protected within a masonry surround.

7.24.4 In PPs 80-85 towards the centre of the trench, two large ceramic pipes were recorded, with one passing over the top of the other. The lower pipe [462] (diameter approximately 0.28m) was aligned NE-SW, while the higher pipe [460] (also 0.28m diameter and 20mm thick) ran in a N-S direction. The pipes were made of fire clay similar to that of kiln bricks.

7.24.5 In PPs 44-46 in the northeast part of the Forge the blast pipe [653] (diameter 0.44m, 30mm thick) met a T-junction, where it continued in both east and west directions along the line of the northern wall as suggested on the Indenture Plan of 1889. The pipe [780] and [778], ran into a square

structure [776] located in the northwest corner of the Forge in the NW ramp trench. The pipe protruded from the south side of structure [776] and continued as [777] in a NE-SW direction. The pipe appeared to follow the line of the outer walls of Structure B as well as the central aisles, again confirming its location as shown on the Indenture Plan.

7.24.6 In Structure B, along the central line of the northwest aisle, a large ceramic pipe [800], [704] and [437] (all 0.3m diameter and 20mm thick) and [449] (0.27m diameter and 20mm thick) was recorded and continued through PPs 10-12, PPs 19-21, PPs 31-33 and PPs 25-27, along a NE-SW alignment. The pipe continued until it reached the northern wall of The Forge.

7.24.7 In PPs 62-64 another pipe was recorded which may have been an addition to the blast pipe; in this location the pipe [507] was an unusual design in that a standard cylindrical centre to the pipe, 0.38m diameter, was contained within an octagonal shield which had an external diameter of 0.42m. However, the protective skin was of hollow construction to rather than solid. The exact method by which such a pie was constructed is still the subject of discussion. Pipe [507] was formed from kiln-brick material.

7.24.8 Variations in the diameters and construction of the differing elements of the blast pipe revealed during the works imply that there were both continued enlargements to the system and repairs. In a few locations the pipe was protected within either masonry or concrete surrounds – these differences could reflect concerns about the vulnerability of the pipe in certain locations, or differing construction techniques, or both.

7.25 External Features

7.25.1 To the northeast of Structure A the remains of what has been identified as an hydraulic accumulator [2] were found (Figure 19 and Plate 6). The feature was founded upon a square concrete base at 1.28m OD of which only one full dimension, 5.2m SW-NE, was seen. Upon the base was a structure built of stock-moulded unfrogged brick, formed to be circular (approximately 13m diameter) in plan on its external edge but stepped and polygonal-shaped internally. This arrangement formed an internal chamber with a diameter of approximately 3.2m, which was lined in at least one area with a timber beam. At the centre of the structure was a cast iron plate, 2.0m in diameter and ¼ inch thick. At four opposing sides of this plate survived vertical threaded bolts, to which the uprights of the accumulator would have attached. On the NE and NW sides two rolled girders sat horizontally to overlap with the structures masonry surround. Their function is unclear but may have either stabilized the structure or served to attach it to ancillary structures. The girder at the NE side was seen to rest at its NE end on another concrete slab or pier base. Curving around the accumulator on its north and east sides was found a curvilinear pipe cut [259], which retained a small iron pipe close to the accumulator. It is possible that this was mechanism for feeding the accumulator, but this remains speculation. Accumulators first came into use in the 1850s although there is no evidence for one on this site until 1894, when it is first seen in an Ordnance Survey map (Figure 18).

7.25.2 A cast iron turntable [10] was exposed just below the tarmac at the northwest end of the site close to the existing site entrance on Harbinger Road. It had a diameter of approximately 2.7m and was recorded at an upper height of 2.10m OD. Upon removal by machine, the underside of the feature could be seen to be a hollow structure with an internal mechanism separate from the surround. The surround had four radiating struts leading from a central piece and bolted to the surround; all of these appeared to be of cast iron. Both the central piece and the outer surround had 12 steel ties (four at the centre, eight at the edges) which would have been secured to concrete stays below ground. The internal mechanism, again of cast iron, had eight radiating 'spokes' supporting the turntable platform at ground level. The letters 'JW' were impressed onto the underside of the feature and are assumed to relate to the name of Joseph Westwood.

7.25.3 External to Structure A on its northwest side was found a brick / cobbled floor [12] covering an area approximately 4m by 6m at a height of 1.65m OD. The 1889 Indenture Plan labels a structure in this position as 'Coach House', although only this floor was found. It survived in good condition, with small truncations in the floor probably corresponding to internal divisions within the structure.

7.26 Phase 8: 20th Century (Figure 22)

7.26.1 This phase of the construction on the site mainly consisted of a series of early to mid 20th century concrete foundation pads and ground beams. The pad foundations relate to additions to the site from 1920 to the 1950s. The 1920-30s additions are associated with the construction of Structure F located to the south of the site; these include concrete pad foundations [269], [161], [174], [157], [128] and [133].

7.26.2 In the northern area of the site, concrete pad foundations with group number [814] are associated with the construction of a large workshop Structure E, in the 1940-50s.

7.26.3 Two large concrete tanks were recorded within the location of the new Structure E: [261] was a square concrete tank and [252] a large rectangular concrete tank. They are thought to have been part of quench tanks. Group [815] consisted of a series of steel reinforced concrete features of unknown use in the southeast corner of this building.

7.26.4 Located in the northeast corner of Structure C group [816] consisted of a number of concrete plinths. Another concrete intrusion [372] was recorded in the southwest corner of this building. Between the concrete features a linear cut feature, [364], which ran in a northwest-southeast direction, is likely to have been used as a pipe trench.

7.26.5 A small cut, [176], located in the southern part of Structure D appeared to truncate the lower end of the flue [175] and was recorded as a drain; but is more likely to belong to a separate flue, as the fill from this cut consisted of a large amount of charcoal and ash. The cut was recorded at a level of 1.46m OD.

7.26.6 Cut [29] was seen running in an NW-SE direction through Structure E. Both ends of this feature were truncated but the remains of some ceramic pipe were seen within the cut.

7.27 Undated and Unphased features (Figure 23)

7.27.1 Concrete ground beams [277], [269], and [267] were seen to truncate features in Structure D. There were a number of other concrete intrusions which could not be dated and comprised contexts [266], [299], [292], [275], [278], [281], [282], [283], [285], [284], [296], [308], [380] and [319].

7.27.2 In Structure A was recorded a linear channel, [7], lined with kiln bricks, including on its floor. The side-walls were five courses high and the outside of the brick channel was encased in concrete with flat iron reinforcing and sealed with a cast iron lid, which may have given access to the channel. This feature truncated the northern wall of Structure A and was in excess of 14m in length. Kiln brick samples were recorded as dating to 1850-1940, although these bricks may have been reused.

7.27.3 A pair of concrete machine bases, [82] and [223], were located in Structure C; they rose above the floor level by 0.49m. A metal tank [224] bridged these two plinths and is part of the construction of this feature. The concrete plinths had the remains of some metal fixings still in place. The plinths were located at a level of 1.95m OD.

7.27.4 In Structure A timbers [66] and [67] were very different from the other timbers located on the site. They were large square oak beams, 0.36m square and 5.61m in length, and were very similar to those used in the construction of the timber gantry located along the eastern wall in the Forge. The timbers were located below the existing floor level and had a 100mm squared groove running the length of the beams on both sides. The timbers were aligned NW-SE. A smaller truncated timber beam, [68], was located to the west of the above timbers. This timber was approximately 2.50m in length and was set central to [66] and [67]. These large beams were likely to have been used to support a large heavy machine and evidence to support this was recorded as context [70]: a large heavy rectangular cast iron plate which measured 1.35m by 0.75. The plate was 300mm thick and sat on top of timber beam [68]. This plate was obviously the remains of a more substantial piece of heavy machinery, which was set in an NW-SE alignment in this area of Structure A.

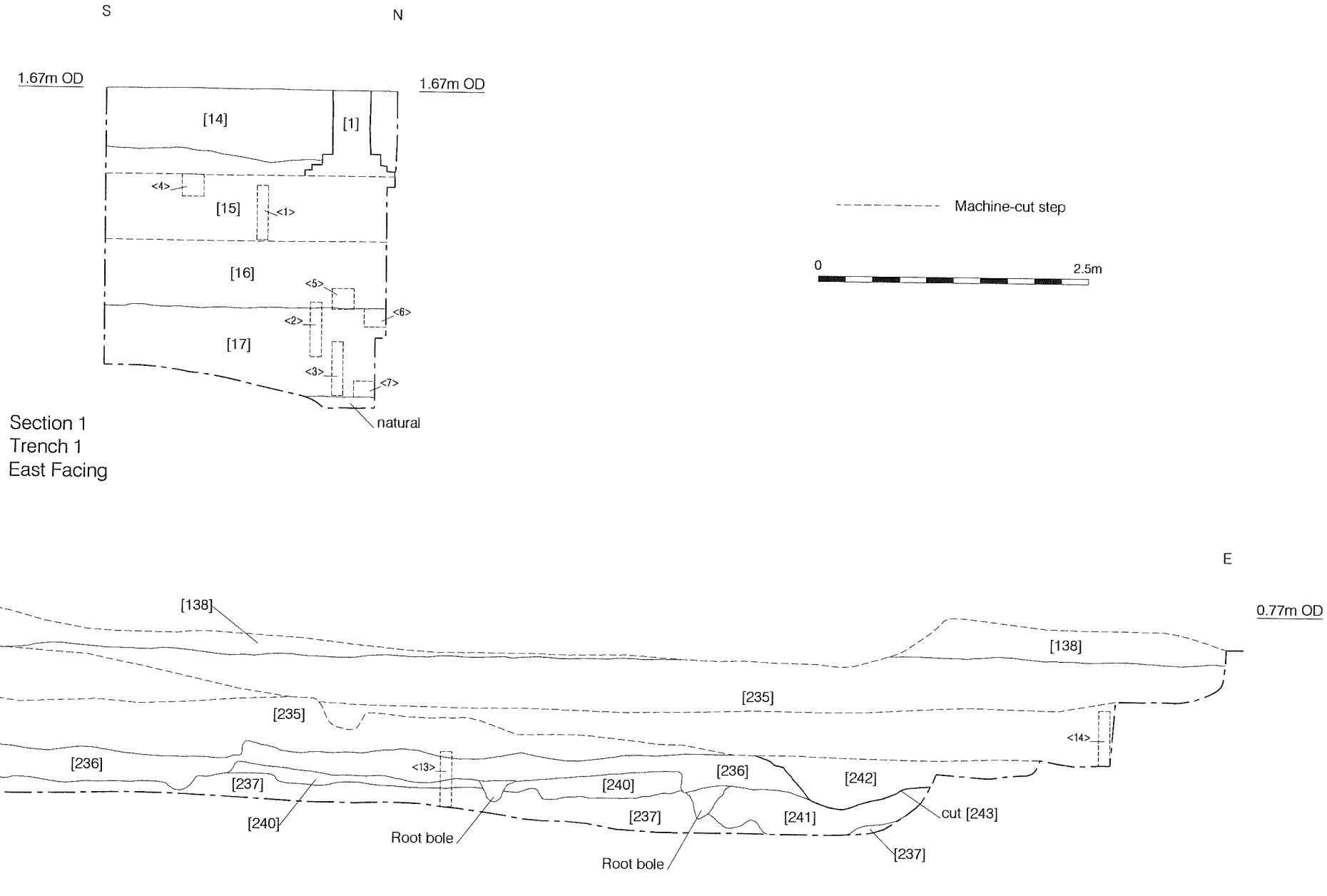


Figure 4
Phases 1-4, Evaluation Sections 1 & 2
1:50 at A4

Figure 5
Phase 5, Survey Plan 1848-1859
1:400 at A3

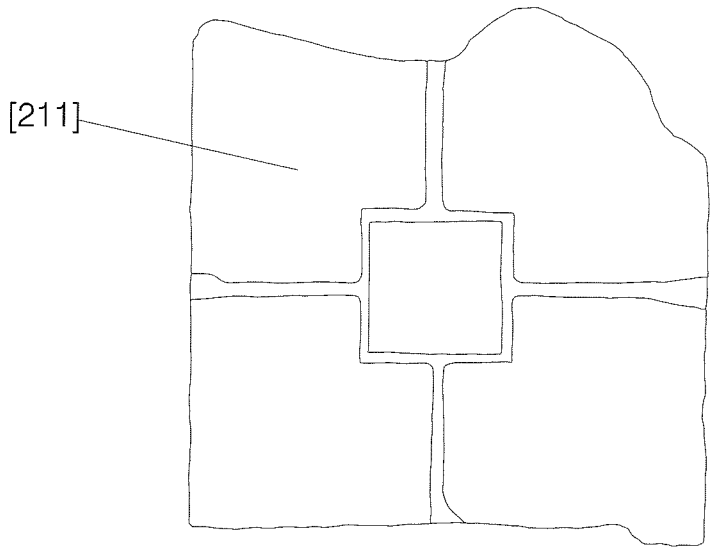


Figure 6
Phase 5, Plan Stanchion Base [211]
1:20 at A4

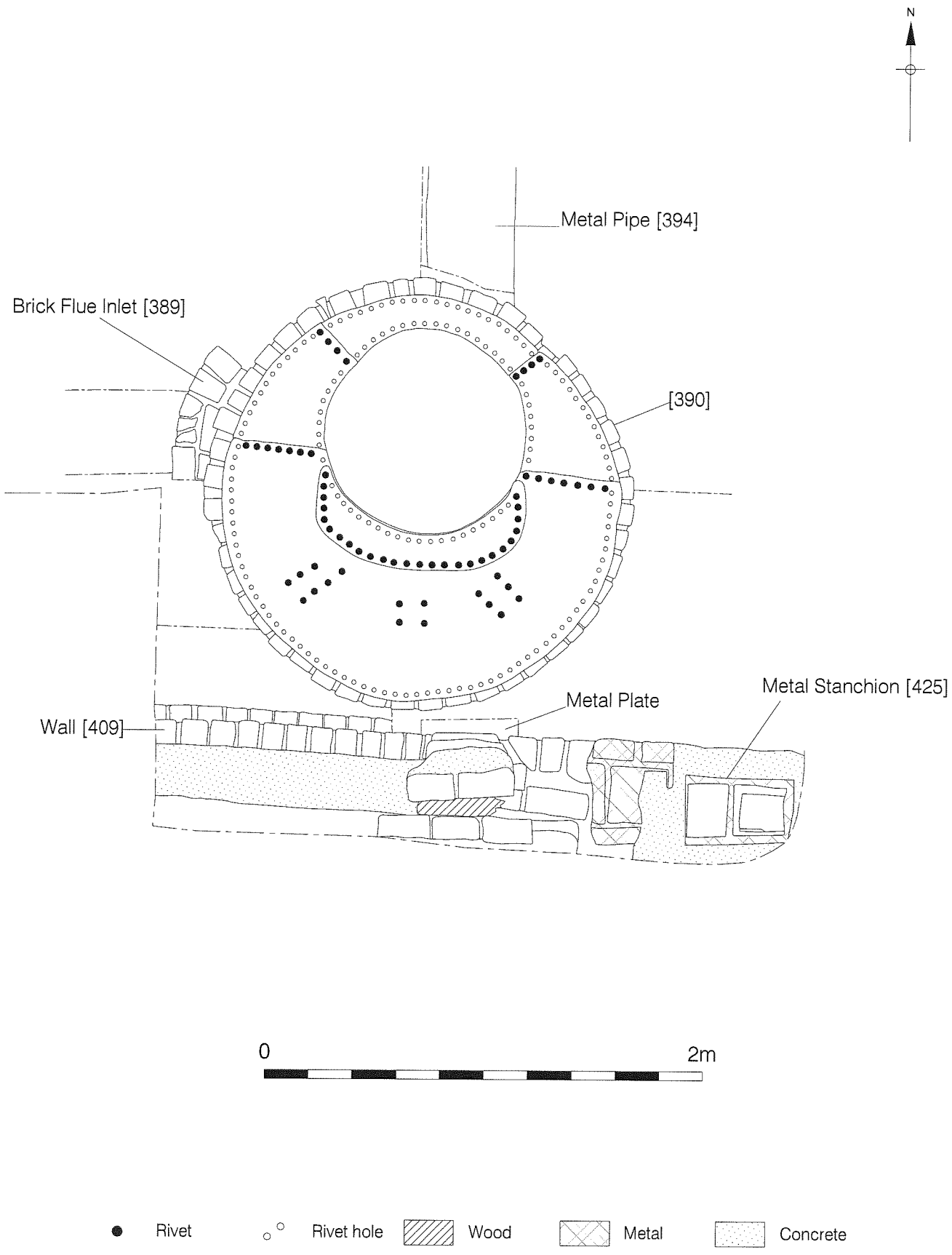


Figure 7
Phase 5, southern wall [409] of Structure A [810] and Phase 7, Re-used Boiler Plate [390]
1:25 at A4

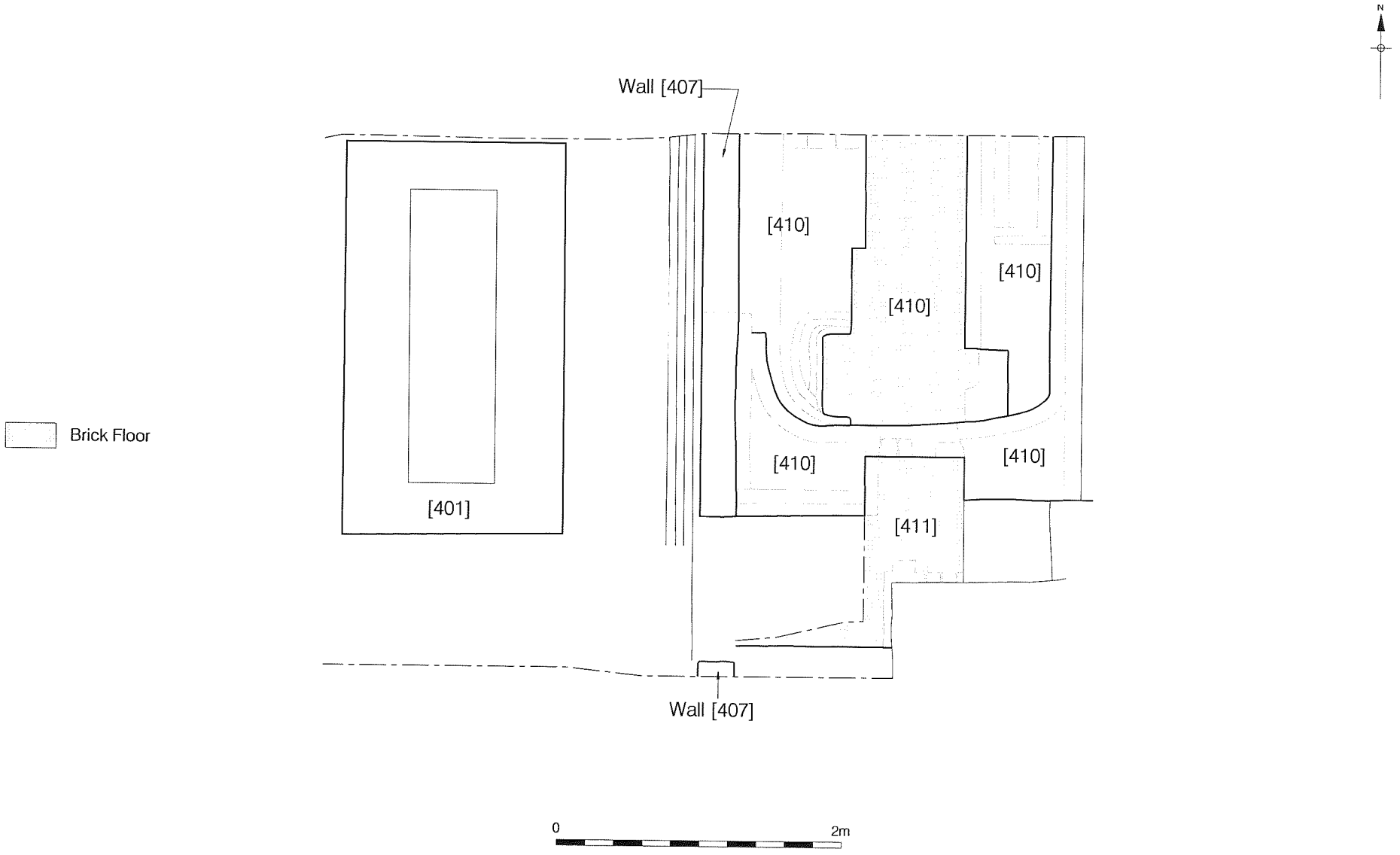


Figure 8
Phase 5, Plan of Quench Tank [404] and Furnace [410]
1:40 at A4

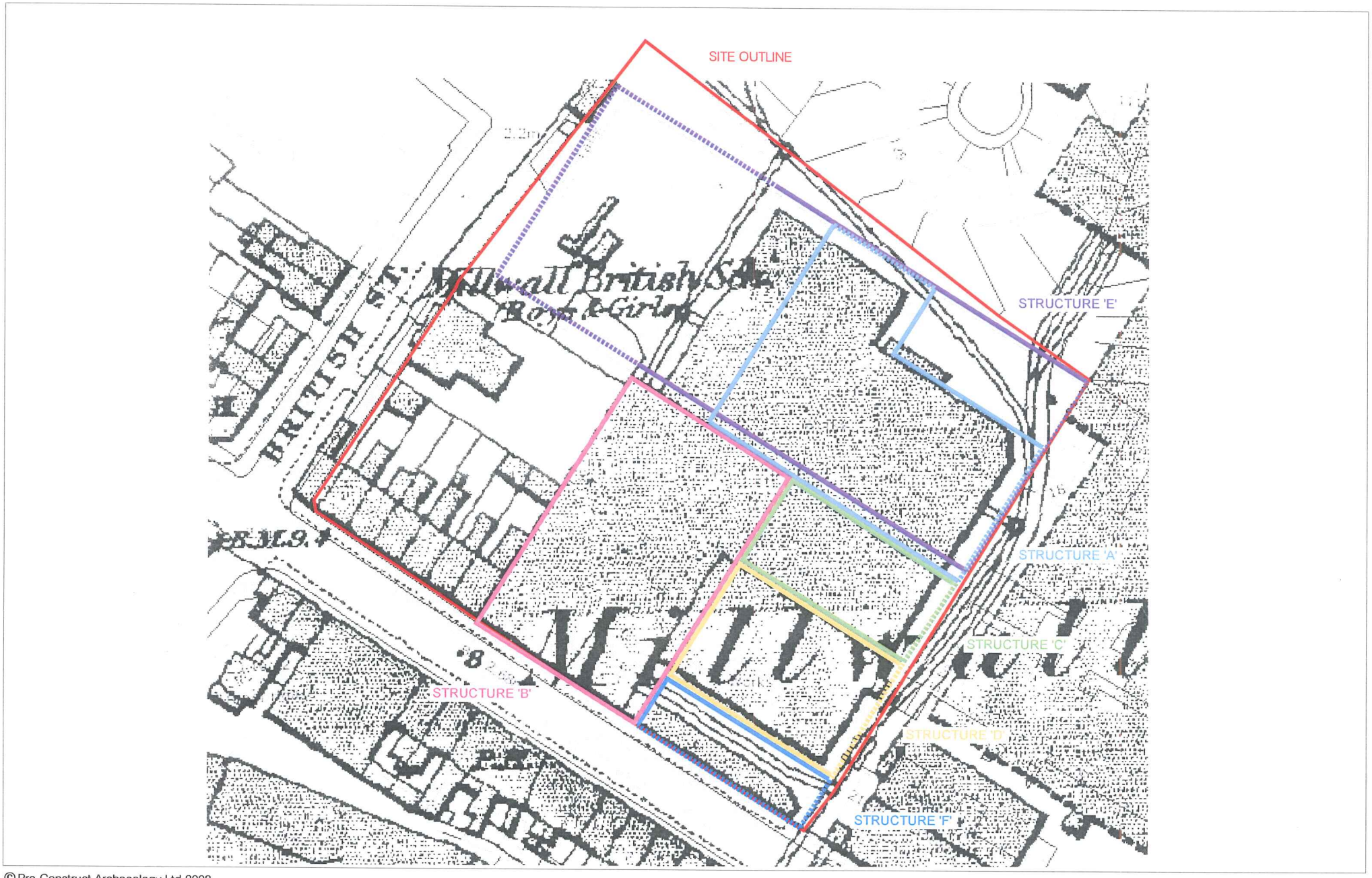
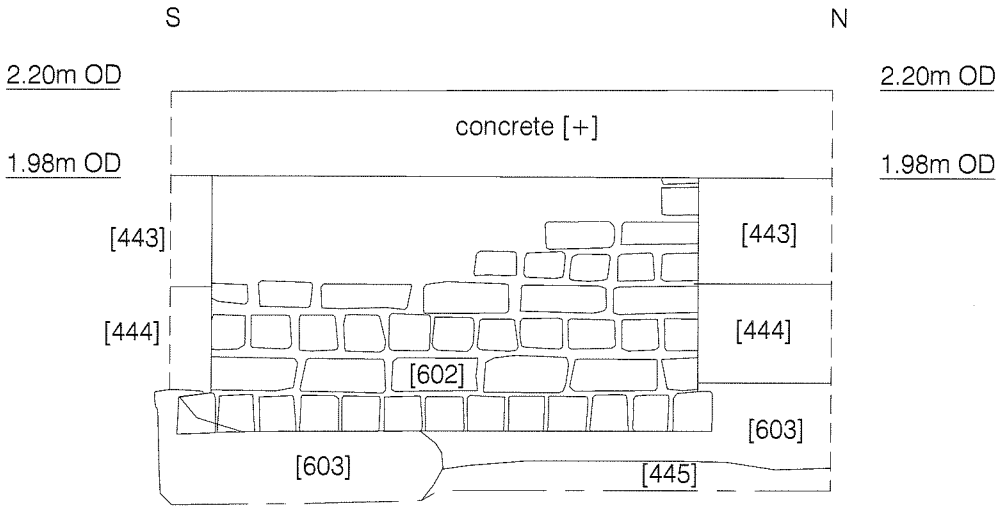


Figure 9
Ordnance Survey map of 1867 with overlays showing outlines of individual structures A to F
1:800 at A4

Figure 10
Phase 6 Survey Plan
1:400 at A3



Section 10
Pile Pit 28-30
East Facing

Figure 11
Phase 6, Smith's Hearth, Section 10, Pile Pit 28-30
1:20 at A4

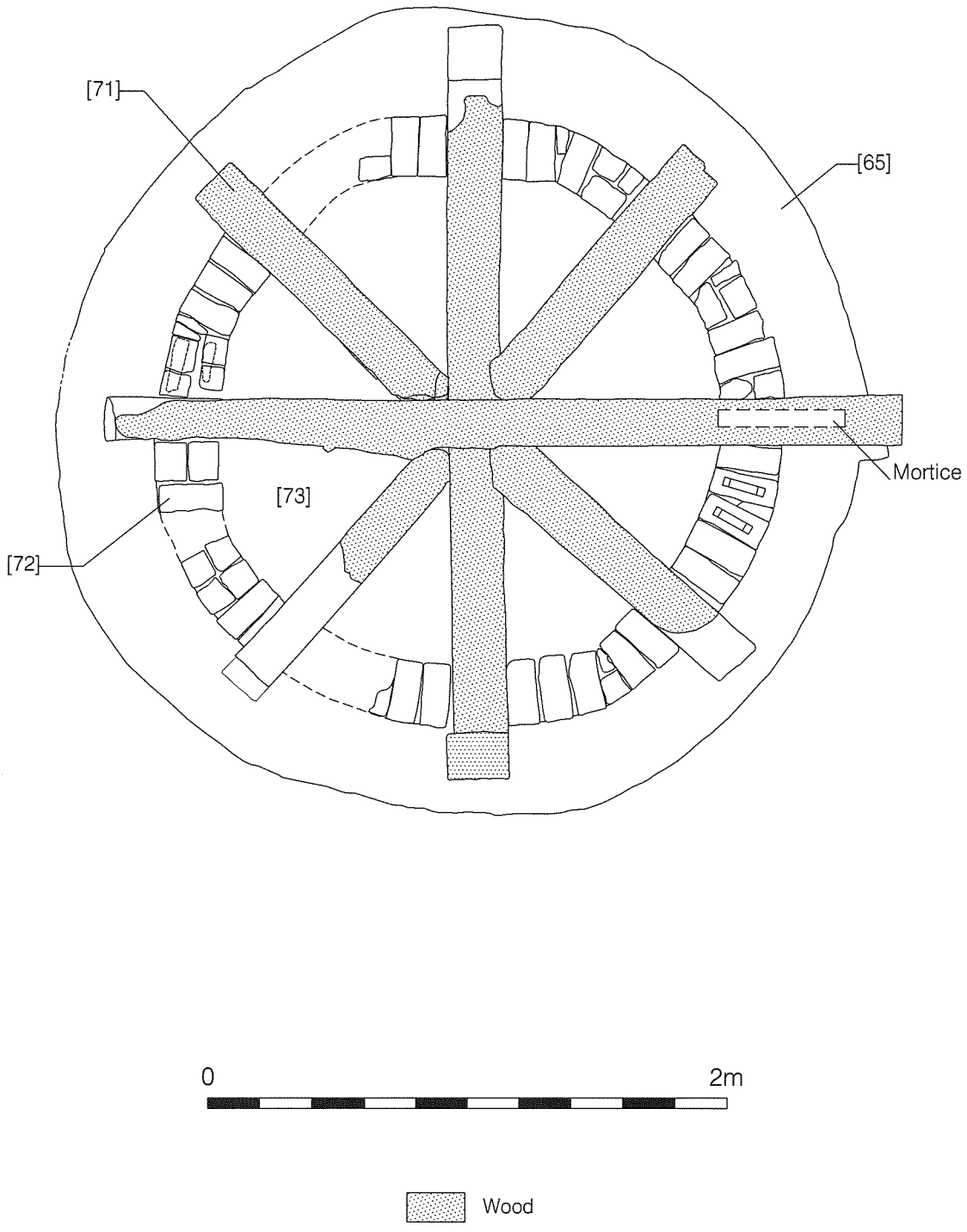
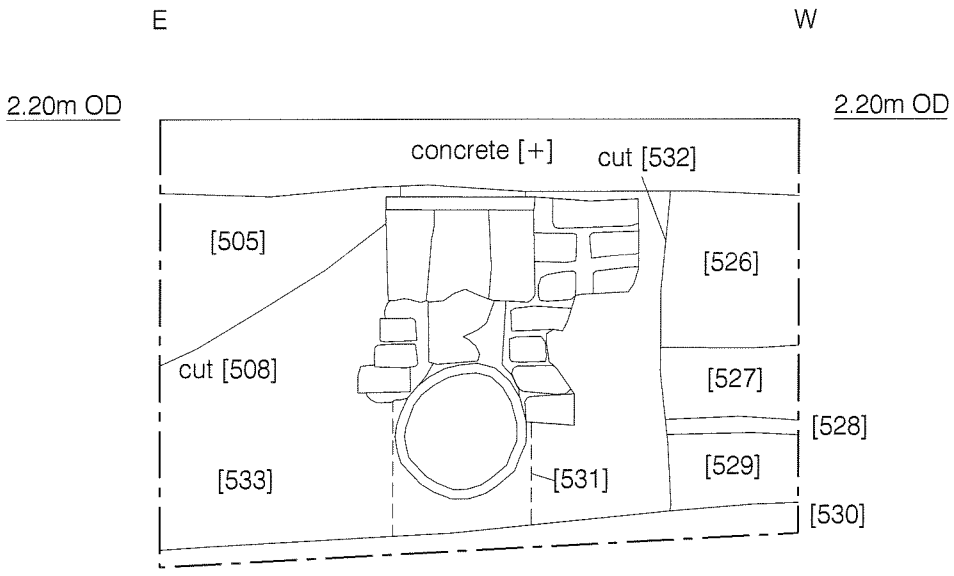
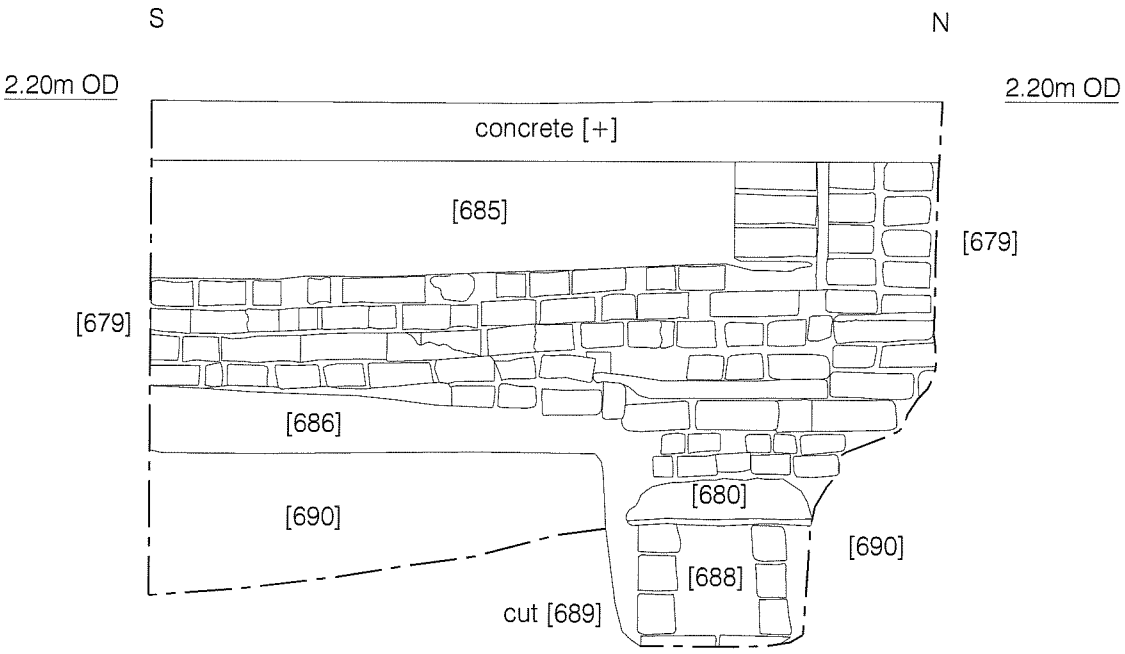


Figure 12
Phase 6, Turntable [65] 1867
1:25 at A4



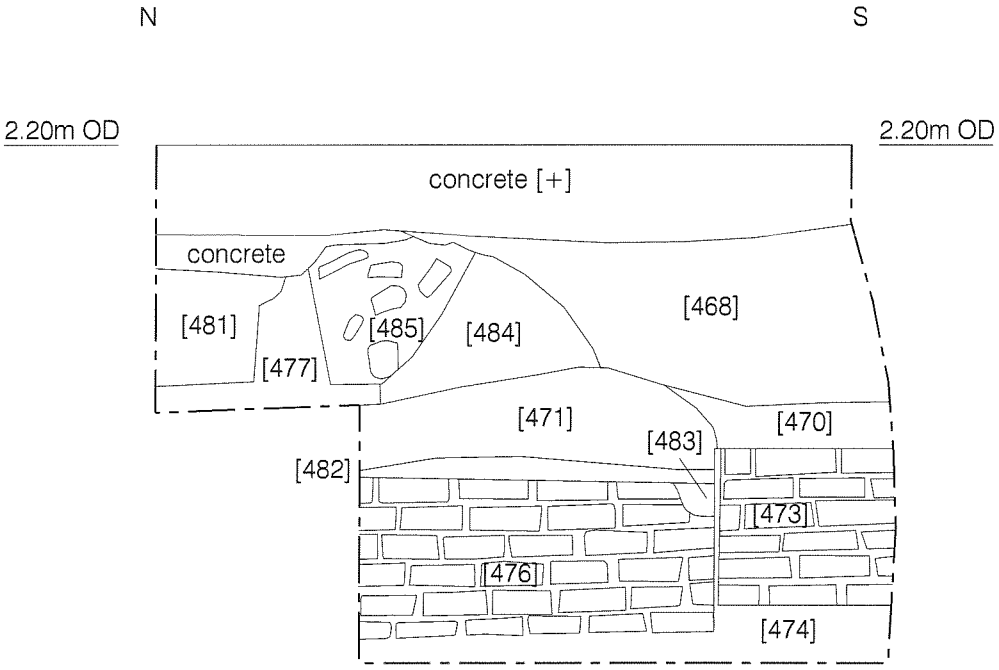
Section 22
Pile Pit 56-58
North Facing
Showing Blast Pipe [531] truncating Floor [528]

Figure 13
Phase 6, Section 22, Pile Pit 56-58
1:20 at A4



Section 40
Pile Pit 4-6
East Facing
Shows flue opening [688] and brick work [679]
extending to the south

Figure 14
Phase 7, Section 40, Pile Pit 4-6
1:20 at A4



Section 16
Pile Pit 74-76
West Facing
Shows three phases of construction, [476] Phase 5, [473] Phase 6 and [477] Phase 7

Figure 15
Phase 6, Section 16, Pile Pit 74-76
1:20 at A4

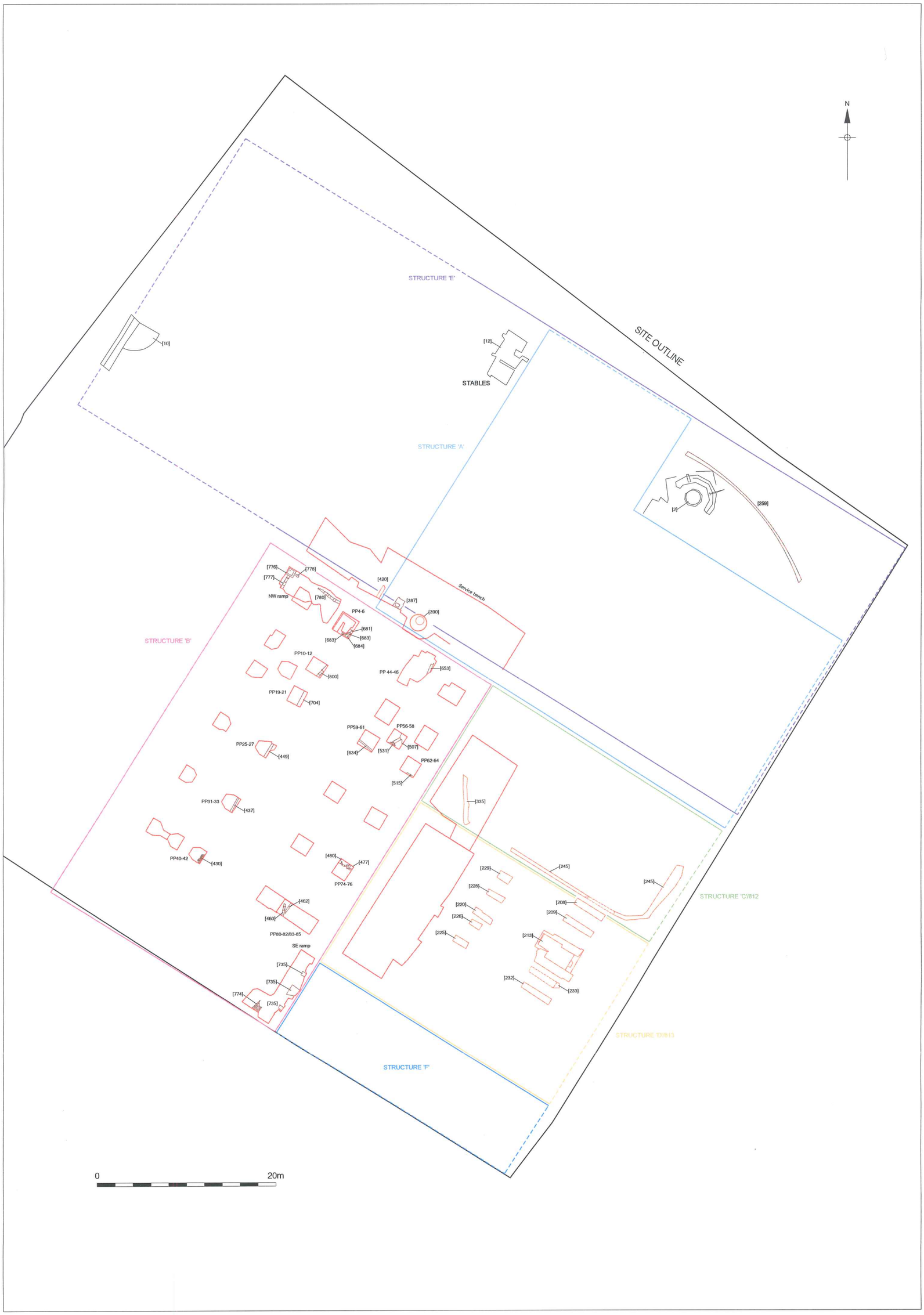


Figure 16
Phase 7, Survey Plan 1884-1894
1:400 at A3

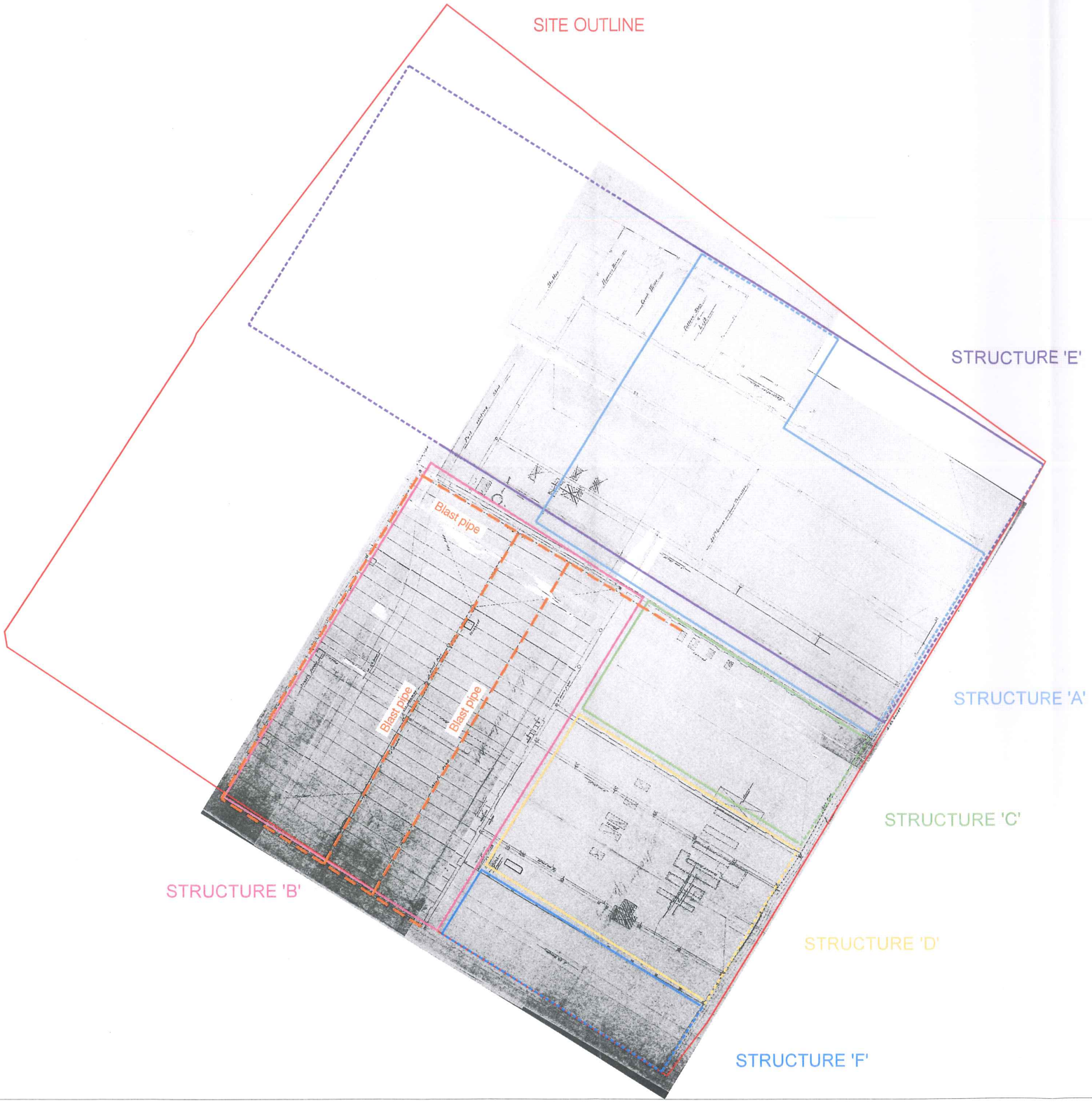


Figure 17
Indenture plan of 1889 with overlays showing outlines of individual structures A to F
1:500 at A3

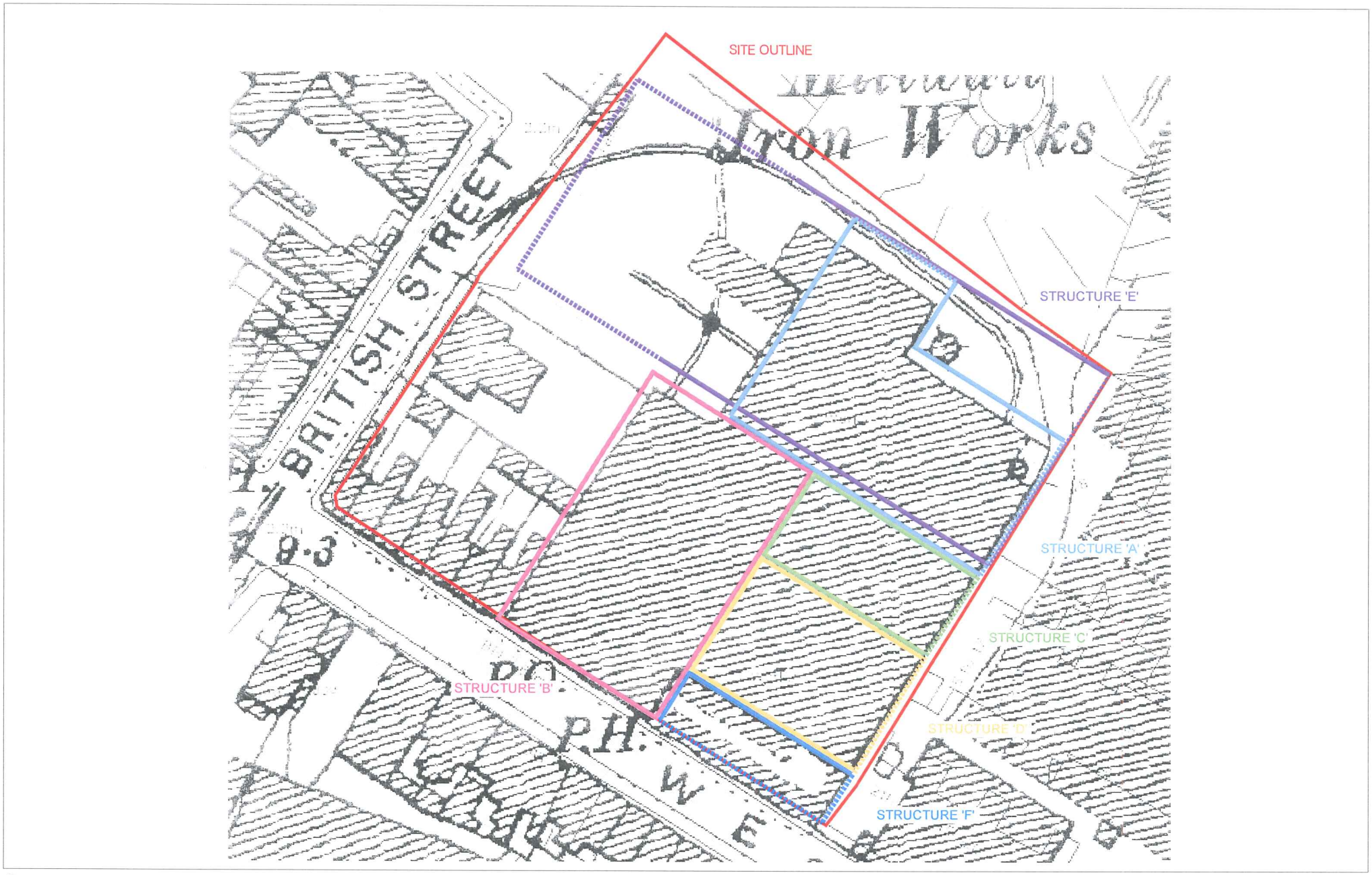


Figure 18
Ordnance Survey map of 1894 with overlays showing outlines of individual structures A to F
1:800 at A4

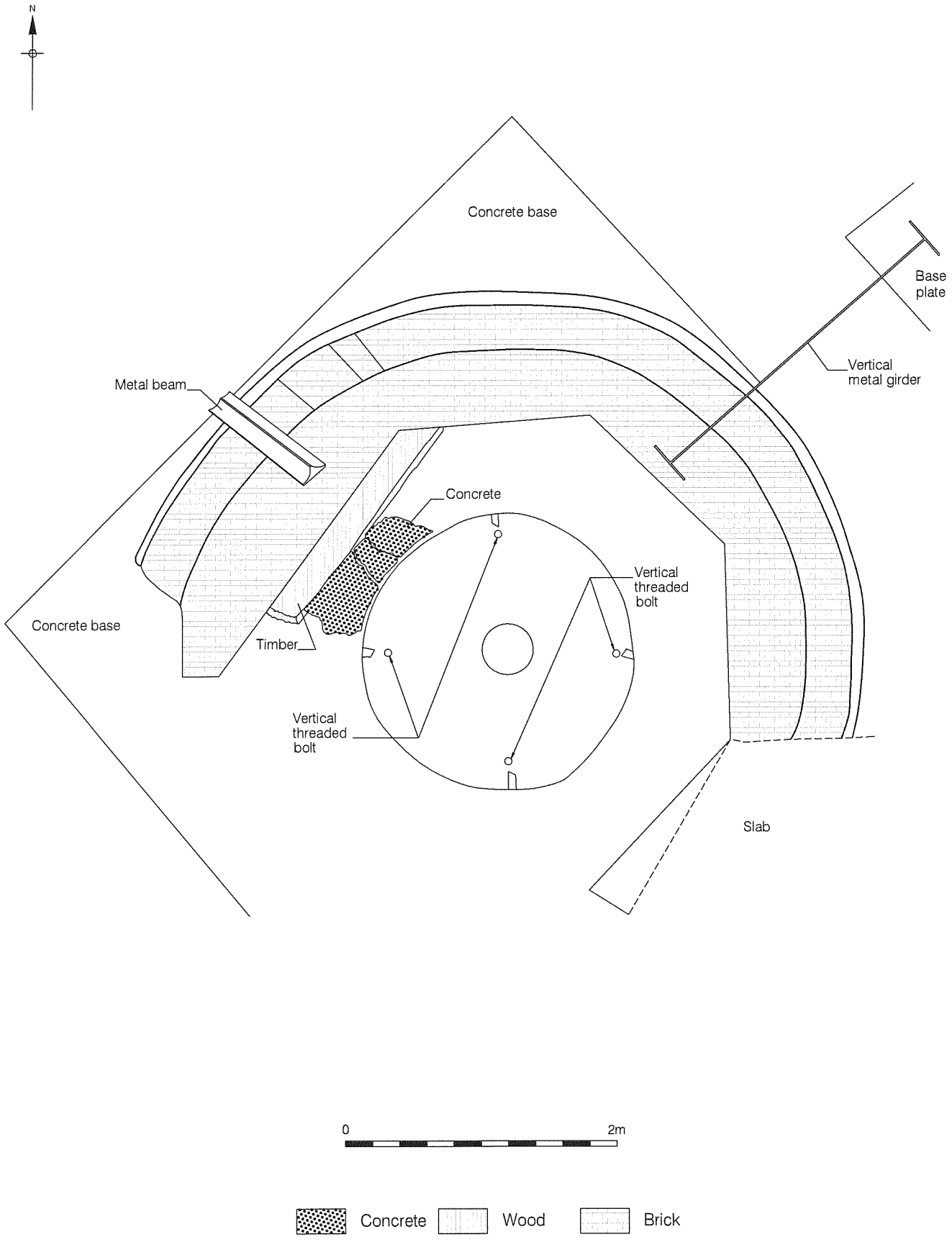
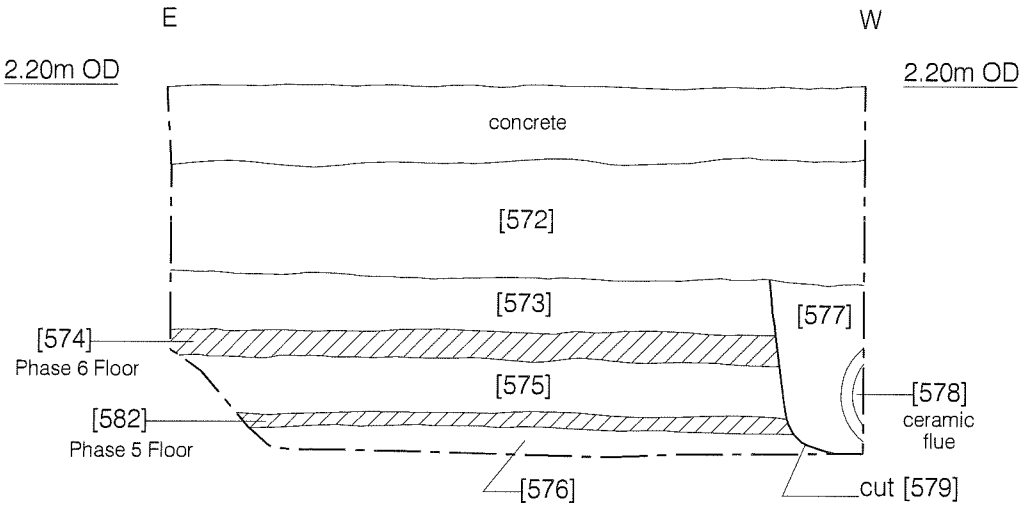


Figure 19
Phase 7, Plan of Accumulator [2]
1:40 at A4



Section 30
Pile Pit 71-73
North Facing
Two floors [582] and [574] truncated
by blast pipe [577] Phase 7

Figure 20
Section 30, Pile Pit 71-73
1:20 at A4

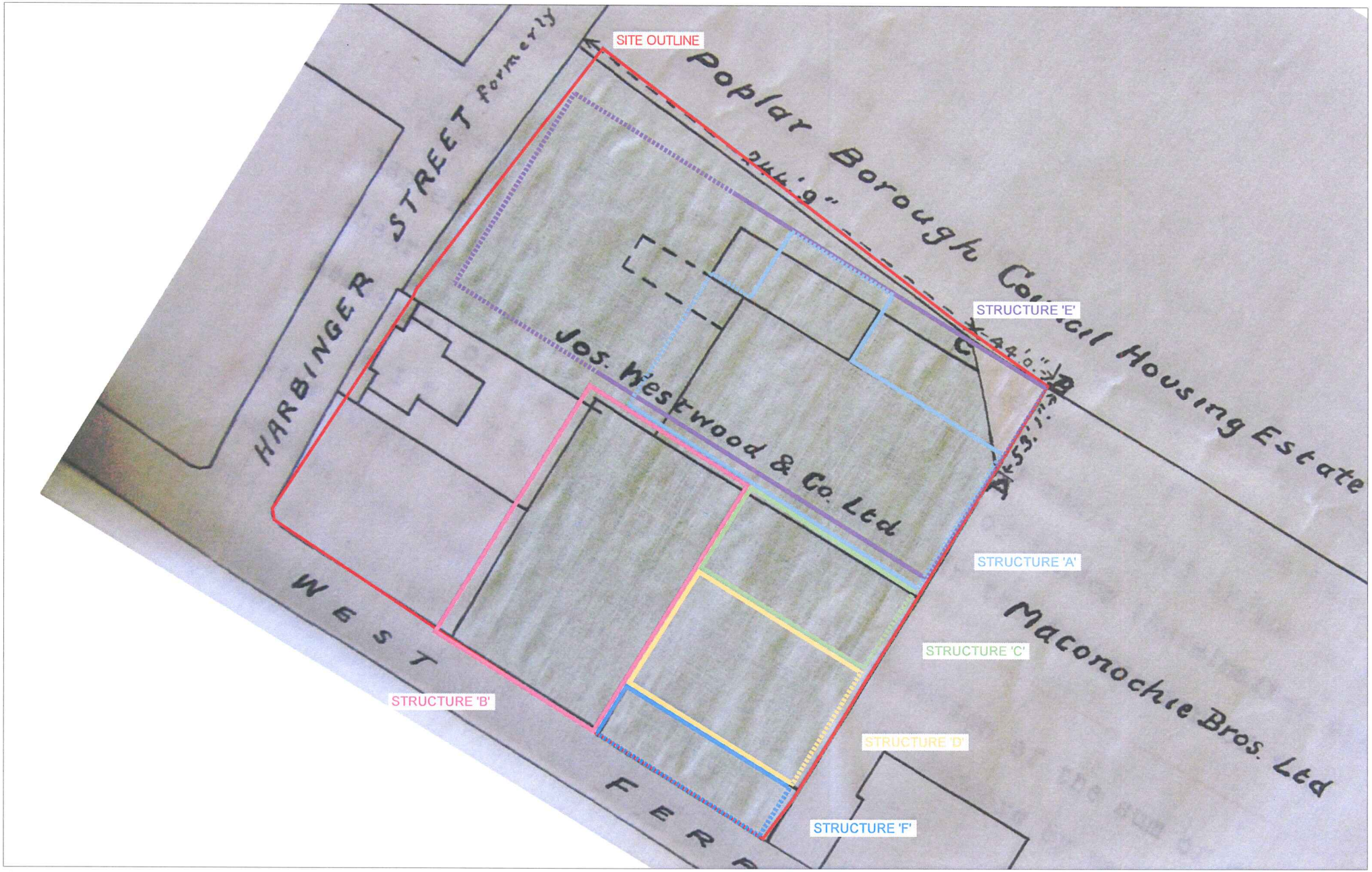


Figure 21
Indenture plan of 1930 with overlays showing outlines of individual structures A to F
1:800 at A4

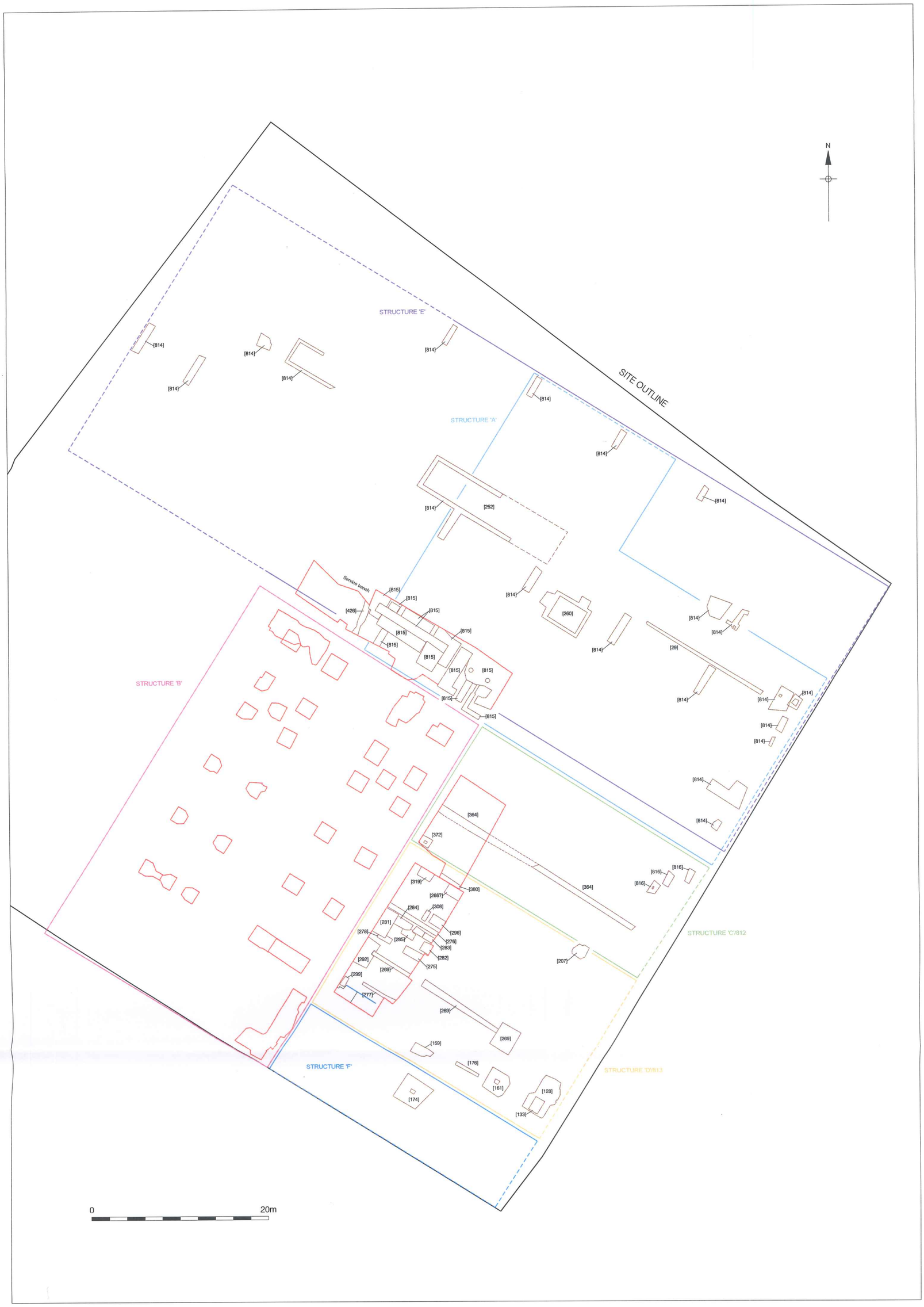


Figure 22
Phase 8, Survey Plan
1:400 at A3

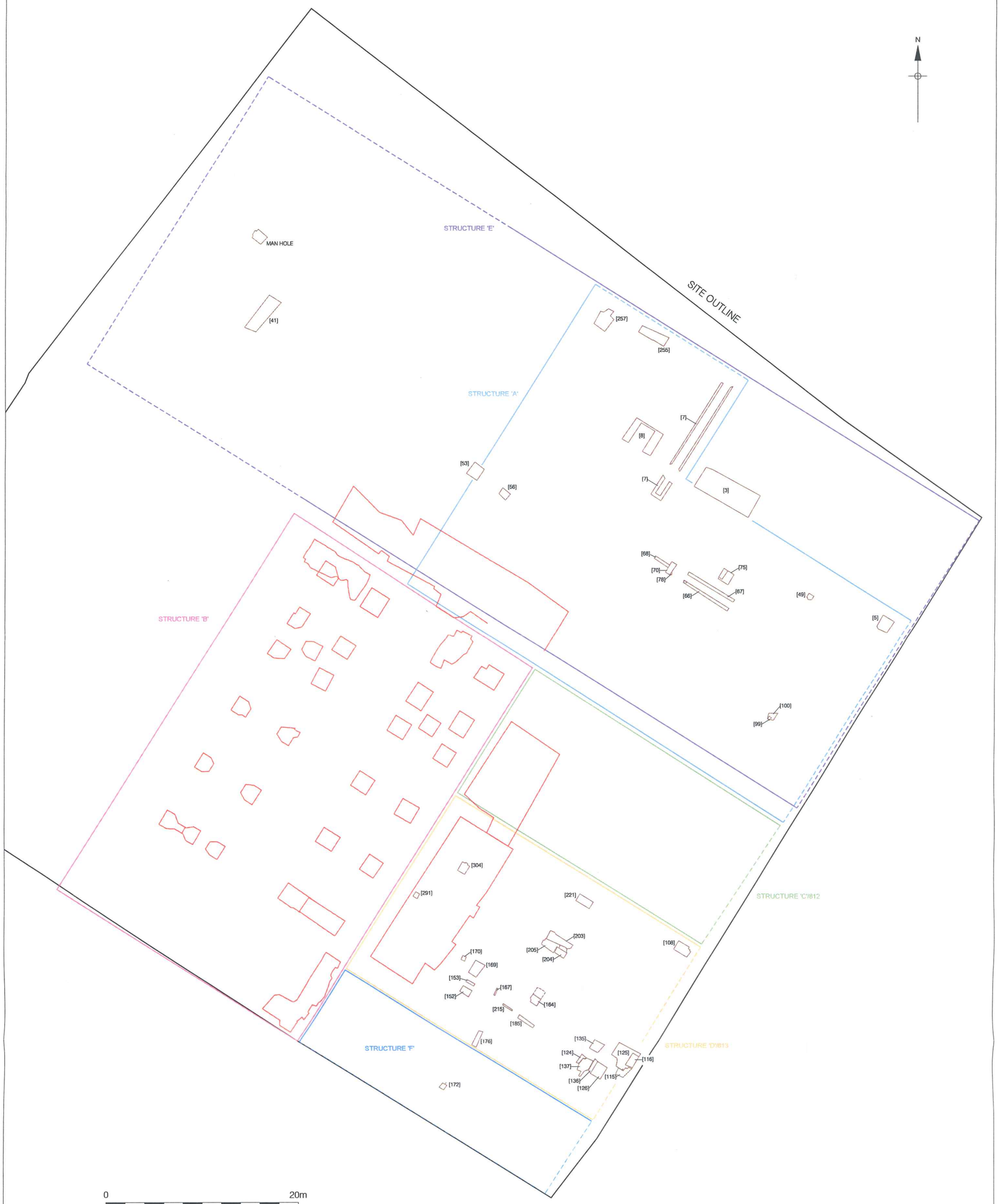


Figure 23
Unphased / Undated
1:400 at A3

Plate 1: Trench 2, section 2, south facing section

Plate 2: Smiths' hearth [38], view south, 1m scale

Plate 3: View north, furnace [410] in Structure A

Plate 4: View SW of blast pipe, Phase 7, in PPs 56-58

Plate 5: View south, well with re-used boiler plate [390]; north wall of Structure B (background)

Plate 6: View SE of accumulator base

8 CONCLUSIONS

8.1 The natural deposits on site consisted of sandy gravel, which would appear from the archaeological evaluation trenches to slope down to the north of the site, at variance with the results of the geotechnical work on site which seemed to suggest that the gravel to the south and north of the site was at a constant level and that it dipped by up to 1m across the central part. However, the geotechnical results, as received, were given as depths below ground surface rather than to an OD height and thus it are possible that the discrepancy in results between the geotechnical investigation and the archaeological investigation may be caused by differences in ground level across the site at the time.

8.2 The natural gravels were sealed by a layer of peat which was revealed across the eastern and northern parts of the site. It was at its greatest extent to the north where it was up to 0.70m thick thinning out to the south. The peat deposit was radiocarbon dated which showed that deposition of the deposit commenced sometime prior to 2470 to 2200 cal BC (4420 to 4150 cal BP), during the Late Neolithic/Early Bronze Age cultural period, and continued after 1630 to 1450 cal BC (3580 to 3400 cal BP). The environmental evidence would suggest a salt marsh with a rich woodland plant community together with sedges and grasses. Cutting the peat were two small channels which were probably the remains of a number of streams which crossed the area.

8.3 The peat was sealed by up to 1.48m of alluvium. These deposits were laid down by fluvial inundation of the site from the Middle Bronze Age onwards, most likely a response to the rising relative sea levels.

8.4 No evidence of Prehistoric, Roman, Saxon, or medieval human habitation or exploitation was recorded on the site.

8.5 The structural remains of two mid 19th century workshops were recorded which were linked by documentary research to occupation of the site by J. S. Russell (Phase 5). The outer wall footings of the two early structures were recorded; they were identified as aisled workshops and were part of the early iron forging and ship building tradition on the Isle of Dogs.

8.6 The structures which defined the extent of the workshops were laid out on an NW-SE axis. Structure A was located to the north of the site and Structure D to the southeast. Internal structural features comprised of rows of metal stanchions, which would have held vertical timbers and made up the internal aisles of the workshops. The northern Structure A had a single line of stanchion bases to the north whilst the Structure D had a double line of stanchions. It is highly possible that the lack of a southern aisle within Structure A is the result of truncation rather than its original absence.

8.7 Features found to survive from these structures include the remains of quench tanks, hearths, turntables, tramways and various machine bases. Nothing survived of machinery on the site which would have been used during its lifespan, so the nature of items which occupied various settings within the works is currently unknown.

8.8 Later additions in the 1860s during the occupation of the site by C.J. Mare (Phase 6) included the construction of a large aisled double height workshop, Structure B. The Forge remains extant on site as a Grade II listed building and retains some of the original and later features, such as overhead gantry cranes. Also during this time a building, the conjoined workshop (Structure C), was erected between Structures A and D.

8.9 J Westwood's company occupied the site from 1884 until the 1940s-50s, during which time the site remained largely unaltered structurally from Phases 5 and 6, with the exception of Structure F at the southeastern corner. In these earlier buildings remains were found of further machine settings, quench tanks, furnaces or flues and hearths, and also a well. The investigation was able to identify the blast pipe in several locations within Structure B, and therefore show that Indenture Plan of 1889 was largely accurate in its detail. The remains of a hydraulic accumulator were also seen as an external feature to Structure A. In the 1940s-50s Structure A was demolished and replaced by a much larger shed, Structure E. Evidence of this building was seen from a number of pier bases.

8.10 In addition, a number of features were found across the site from within all structures which could not be identified with certainty either during the fieldwork or in the post-excavation work undertaken so far. Further investigation into some of these, for example the unexplained iron platform found within Structure D and thought to be discarded during ship manufacture, will form part of future analysis work.

9 ORIGINAL AND ADDITIONAL RESEARCH QUESTIONS

9.1 Original Research Objectives

9.1.2 The research design for the investigation comprised the following areas for investigation:

9.1.3 The presence or absence of prehistoric features or waterlogged deposits in the peat layers.

Evaluation of the deposits beneath the made ground was confined to two evaluation trenches. These revealed no evidence of prehistoric features or artefacts. A small channel cut through the peat is probably the remains of a small stream that crossed the peat marsh.

9.1.4 The presence or absence of structures or occupation horizons during the medieval period.

No features or finds were revealed dating to the medieval period. Prior to the late post-medieval reclamation of the area the site was subject to periodic riverine inundation which led to c.1.5m of alluvial deposits being laid down since the Middle Bronze Age.

9.1.5 The opportunity for environmental sampling of the natural peat and alluvial deposits. From the borehole logs, thick deposits of peat are known to occupy the north of the site. What can be learnt from a study of the peat?

The peat and alluvial deposits were subject to column and bulk environmental sampling. The peat formation commenced in the Late Neolithic/Early Bronze Age and continued into the Middle Bronze Age. The pollen and plant macrofossil data provide evidence for a rich wet woodland plant community comprising alder, most likely forming fen carr, with an understory of sedges and grasses growing on the peat surface. On nearby dry land, oak and lime woodland with occasional elm dominated the vegetation cover, although the presence of shrub land suggests that areas of less dense woodland also existed. After 1630 to 1450 cal BC (3580 to 3400 cal BP), the pollen record indicates retrogressive succession towards wetter, open conditions most likely dominated by salt marsh communities. More open environments on the dry land are also indicted after 1630 to 1450 cal BC (3580 to 3400 cal BP), by the low and sporadic values of lime and oak, together with an increase in non-arboreal and heliophilous arboreal taxa indicating probable modification of the landscape by human activities, which undoubtedly involved woodland clearance, cereal cultivation and grassland formation, and which may have occurred as a response to changes in the natural environment.

9.1.6 Investigation of the construction detail of the Millwall Iron Works.

Archaeological investigation on site coupled with a study of cartographic and documentary sources have suggested at least four phases of activity on site associated with the Millwall Iron

Works, commencing in the mid-19th century when two structures (A and D) were erected to the northeast and southeast of the site with evidence of furnaces and a tramway. Thereafter further structures (B and C) were added including the extant Grade II listed Forge to the southwest of the site. Later phases of activity consisted of the construction of machine bases with associated quenching tanks and remodelling of the pipework and internal features.

9.1.7 *The phases of changes to the former buildings and how this relates to their changing use and / or level of use.*

At least four phases of building were revealed during the archaeological investigation. It is only by using the historic maps that an archaeological sequence could be suggested. Many of the features found within the structures could only tentatively be assigned to a particular phase of building and a number of features were left unphased. However, a sequence of development has been proposed which sees two structures (Structures A & D) being constructed in the mid 19th century with two further structures added soon after (Structures B & C). The last two buildings were added in the mid 20th century (Structures E & F). Through a study of the documentary and cartographic sources the use of the buildings at various times can suggested.

9.1.8 *On the early 19th century maps several buildings appear. What is the nature of these structures and is it possible to assign a function to them?*

Several structures were revealed on site that accord with buildings on the historic maps. By the late 19th century these buildings are often annotated, for example, with the boiler makers shop to the north of the site and the smithy and planing shop to the south. However, very little evidence of the activities that were taking place in the buildings survived into the archaeological record. With the exception of furnaces to the southwest of Structure A much of the remains consisted of machine bases, tanks and flues with little evidence of what the machines that had stood on them had been or what processes were taking place.

9.1.9 *To what degree, do the 19th and 20th century structures survive on the study site?*

With the exception of the Grade II listed Forge building (Structure B) most of the earlier structures survived only as foundations and beneath ground features such as flues, tanks and machine bases.

9.1.10 *Are there any other buildings on site and that are not documented on the maps?*

No major structures were revealed on site that were not documented on the maps. However there is perhaps evidence that the furnaces in the southwest corner of Structure A may have been

within an extension to the building that was not documented. A small office building in the area of Structure C was also revealed.

9.2 Additional Research Questions

9.2.1 Whilst most of the original research questions have been answered the following may be areas for further research at the analysis and publication stage:

- Is it possible with further research to refine and possibly sub-phase the site?
- How may the use and identification of unknown features be resolved with further research into the nature and working practices of 19th century iron forging and manufacturing?
- Is it possible to further interpret archaeological remains in association with historic information? A wealth of sources are available and have been consulted by GLIAS, particularly Mr Tom Ridge, and this information should allow a better understanding of the works and the evidence revealed.
- Furthermore, how can the archaeological evidence be related to the accounts of contemporary visitors to the site, such as Barry? Additionally information passed to PCA by GLIAS includes an account of a visit in 1864 by the Chief Engineer of the US Navy, J W King. His account includes details of the buildings occupying the part of the Millwall Ironworks which the site occupies, and refers to "rolling mills, the forge, the armor-plate mills, boiler shop, armor-plate planing shop, and smithery" (King 1865, 27, courtesy of Tom Ridge 2008).
- Is it possible to identify specific manufacturing processes for which the hearths and furnaces found in various locations were being used? Can these be related more specifically to flues which were also found?
- Can the hearths, furnaces and flues which were found be shown to be typical of the period?
- What conclusions can be drawn from archaeological evidence for water management at the site? What evidence is there for the collection and reuse of water?
- Is it possible to identify the origin and use of the iron platform in Structure D?
- Is it possible to further identify and interpret the well-structure associated with Phase 7 in Structure A, and ascertain any possible change of uses of this and associated features?
- From the comparison between archaeological and documentary sources what confidence can be applied to the accuracy of the latter? What implications can this have for other parts of the surrounding Ironworks which did not form part of the site?

10 CONTENTS OF ARCHIVE

10.1 The paper archive

Context sheets	809 sheets
Plans (1:20)	50 drawings on 50 sheets
Sections (1:10)	56 drawings on 68 sheets
Sections (1:20)	4 drawings on 2 sheets
Other notes	
Area sketch plans	10 sheets

10.2 The finds archive

Ceramic Building Material	6 Boxes + 10 Crates
Wood	1 Box
Metal	1 Box + 1 Crate
Mixed	Clay tobacco pipe, Pot, Glass 1 Box
Slag	4 Boxes
Grindstone	1 Crate

10.3 Environmental archive

Bulk samples	9
Column samples	5

10.4 Photographic archive

Black and White 35mm	265 photographs
Colour Slide 35mm	385 photographs
Colour medium format	99 photographs
Black and White medium format	99 photographs
Digital Image	633 photographs

11 IMPORTANCE OF RESULTS AND PUBLICATION OUTLINE

11.1 Importance Of The Results

11.1.1 The archaeological investigations at the former Millwall Iron Works, Westferry Road, Isle of Dogs have added to an understanding of the archaeological past on the Isle of Dogs peninsula.

11.2 Prehistoric: River Side Exploitation

11.2.1 The absence of *in situ* prehistoric material, on the edges of a salt marsh environment adjacent to the River Thames northern bank, is of significance for prehistoric occupation along this part of the River Thames. The absence of archaeological material is of equal importance when considering the site through time. Although evidence of prehistoric structures (trackways) has been previously recorded in areas of the Isle of Dogs, it may be suggested that the site was predominately a flooded landscape during this period. The peat deposits suggest the presence of a salt marsh which may have been exploited by man by means of trackways such as found on other sites in the vicinity but was not presence within the limited area investigated.

11.3 Later Prehistoric to Early Post-Medieval: Environmental Conditions

11.3.1 Environmental analysis has indicated that from the late Neolithic to the early Bronze Age through to the early medieval periods the site was typified as marshland along the banks of the River Thames. Prior to the archaeological investigations it was considered possible that archaeological material dating to these periods might have been present on site, however, the investigations have recorded an environment not easily usable for permanent settlement.

11.4 Post-Medieval Industrial Development

11.4.1 The most significant archaeological results were those associated with the construction and development of the Millwall Ironworks. The growth of the iron works from an initial two structures during the tenure of C.J. Mare, who constructed Brunel's SS Great Eastern, to the 6 structures which existed by the 1950s was manifested in the archaeological record. Remains of the construction techniques of the workshops and some evidence of the layouts of furnaces and machine bases was revealed.

11.5 Further Work: General

11.5.1 The main focus of further analysis and publication for the site should concentrate on the post-medieval period. It will be necessary to fully incorporate and interpret the historical research already undertaken by CgMs (Lowe forthcoming) and, if necessary, refine the site phasing accordingly. This is particularly pertinent to the phases assigned to Phases 5, 6 and 7, which will require some alteration/further sub-division prior to publication. Incorporation of the existing

historical evidence, in addition to analysis of cartographic evidence, and in combination with other non-consulted sources, will facilitate an extended discussion of how the iron works developed over the period of its existence

11.6 Further Work: Specialists

11.6.1 Future work has been identified by the appropriate specialists included in the report (see appendices) and are listed below.

11.6.2 Building Material

It is recommended that some of the whole brick samples are retained for further analysis by local industrial societies and kiln brick stone fabrics retained as a small reference collection. It is also recommended that further research into the use of Coade stone and yellow sandstones in the Iron forging industry during the industrial revolution is undertaken and should be included in any further publication.

11.6.3 Metal work

The iron objects significantly represent the documented ship-yard activities in the late 19th and early 20th centuries and should be included in any further publication of the site. For this purpose some objects will require further identification. A range of significant tools and fittings should be drawn.

11.6.4 Iron slag

The slag should be studied by a relevant specialist.

11.6.5 Timber

A short summary report with full references should be produced on the ship's timbers.

11.6.6 Historical Research

The historical research undertaken prior to the assessment will be fully incorporated and expanded upon. During the compilation of the assessment it has only been possible to minimally incorporate the wealth of historical and cartographic material regarding the site. However, it is anticipated that full consideration of the historical material will refine the current phasing and sub-phases presently assigned to archaeological material dating to the 19th and 20th centuries.

11.7 Publication Outline

11.7.1 It is anticipated that the results of the archaeological investigations conducted at Millwall Iron Works, Westferry Road, Isle of Dogs will be published as an article either in a local Archaeological Journal such as the Transactions of the London and Middlesex Archaeological Society or in a more specialised industrial journal such as the Industrial Archaeological Review.

11.7.2 A brief outline of the publication as it may appear is as follows:

Introduction

The circumstances of the archaeological investigations will be discussed and a brief introduction to the archaeological, historical and geological background to the site will be related.

Archaeological Sequence

The report will be focused on the development of the iron works on the site. Finds information will be largely integrated with the main report. The report will be illustrated with phased plans, historic maps and site photographs. It is anticipated that the results of the standing building survey undertaken by CgMs will be incorporated into the main report.

Discussion

The development of the site will be discussed with reference to other similar iron works.

11.7.3 The analysis and publication phase will see the incorporation of the areas for further research outlined above and a combination of these archaeological results with the historic buildings assessment undertaken by CgMs (Jon Lowe forthcoming) into a publication. Pre-Construct Archaeology Ltd have secured from CgMs (on behalf of their client) a suitable budget for the analysis and publication of the archaeological results.

12 ACKNOWLEDGEMENTS

12.1 Pre-Construct Archaeology Ltd would like to thank Suzanne Gailey of CgMs for commissioning the work on behalf of Glenkerrin UK Ltd, who kindly funded it. We also thank David Divers (English Heritage) for monitoring the investigation on behalf of the LPA.

12.2 Pre-Construct Archaeology Ltd would also like to express their gratitude to Malcolm Tucker and Tom Ridge of GLIAS, who provided continued interest, advice and expertise during the fieldwork and post-excavation.

12.3 The author would like to thank Shane Maher, Will Johnston, Guy Seddon, Des O'Donoghue, Adam Brumm, James Langthorne, Andy Stewart, Rachael Morgan, Amy Klieman, Sophie Hunter, Tom O Gorman, T Bowie, A Palmer and Ryzard Bartkoviak for all their assistance during the investigations. The author would also like to thank Lisa Lonsdale for the logistics, Jem Rogers for the surveying, Mark Roughley for the illustrations and Chris Jarrett, Kevin Hayward, Märit Gaimster, Damian Goodburn and ArchaeoScape, for their specialist input. Furthermore, the author would like to thank Chris Mayo for his project management and Jon Butler for the post-excavation management and editing.

13 BIBLIOGRAPHY

Aldsworth, F., 2003 'An Historical Building Assessment of Nos. 397- 411 Westferry Road, Millwall', Broadway Malyan unpublished report.

Barry, P., 1863 *Dockyard Economy and Naval Power*, London

Boyer, P., 2007 '30 Ferry Street, Isle of Dogs, London Borough of Tower Hamlets: An Archaeological Desktop Assessment', Pre-Construct Archaeology unpublished report.

Gailey, S.

- 2007a 'Archaeological Desk Based Assessment: Land at Westferry Road, Millwall, London Borough of Tower Hamlets', CgMs unpublished report.
- 2007b 'Phase One Specification for an Archaeological Monitoring Exercise: Land at Westferry Road, Millwall, London Borough of Tower Hamlets', CgMs unpublished report
- 2008 'Addendum to the Specification for an Archaeological Monitoring Exercise Land at Westferry Road, Millwall, London Borough of Tower Hamlets', CgMs unpublished report.

Hawkins, D., 2007 'Proposal for an Archaeological Field Evaluation Land At 397-411 Westferry Road London E14', CgMs unpublished report.

King, J W. 1865 'Report on the Dock-yards and Iron Works of Great Britain and France', courtesy of Tom Ridge.

Primary Sources

Spackman Dole and Hood [Solicitors], undated. Share Certificate in the Millwall Iron Works, Ship Building and Graving Docks Company (ACC/1414)

Internet Sources

RCHME 1994 Survey of London: Volumes 43 and 44: Poplar, Blackwall and Isle of Dogs, http://www.british-history.ac.uk/report.asp?compid=46507

APPENDIX 1: CONTEXT INDEX

Site Code	Context No.	Plan	Section / Elevation	Type	Description	height m OD	Phase
WYM 07	1	3D Survey	S (1)	Masonry	E/W wall of northern workshop	1.67m	5
WYM 07	2	2 & 3D Survey		Masonry	Remains of accumulator N/E corner	1.32m	7
WYM 07	3	3D Survey		Concrete	Concrete Possible machine base	2.2	
WYM 07	4	2 & 3D Survey		Metal	Circular plate, centre of accumulator	2.17	7
WYM 07	5	3D Survey		Masonry	Manhole, N/E corner		7
WYM 07	6	Post ex & 3D Survey		Masonry	N/S wall, northern workshop	1.46m	5
WYM 07	7	7 & 3D Survey	S (5)	Masonry	Concrete & fire brick lined flue, N/S		7
WYM 07	8	Post ex & 3D Survey		Concrete	Concrete, possible tank	1.49m	
WYM 07	9	Post ex & 3D Survey		Masonry	E/W wall same as [1]	1.48m	5
WYM 07	10	10 & 3D Survey		Metal	Late metal turn-table	2.10m	7
WYM 07	11	Post ex & 3D Survey		Masonry	N/S wall same as [1] & [9]	1.53m	5
WYM 07	12	12 & 3D Survey		Surface	Brick & granite floor, butts [1])	1.36m	5
WYM 07	13	Post ex & 3D Survey		Masonry	E/W wall same as [1] & [9]	1,36m	5
WYM 07	14	Eval Trench 1	S (1)	Layer	Demolition layer, seals all structures	1.90m	7
WYM 07	15	Eval Trench 1	S (1)	Layer	Upper level of alluvium	1.12m	4
WYM 07	16	Eval Trench 1	S (1)	Layer	Lower level of alluvium	-0.36m	4
WYM 07	17	Eval Trench 1	S (1)	Layer	Layer of Peat	-0.36m	3
WYM 07	18	Eval Trench 1	S (1)	Layer	Layer of Natural sand	-1.18m	2
WYM 07	19	3D Survey		Timber	Timber floor support east of track [21]	1.23m	6
WYM 07	20	3D Survey		Timber	Timber floor support east of track [21]	1.26m	6
WYM 07	21	3D Survey		Metal	Damaged rail track aligned N/S	1.37m	
WYM 07	22	3D Survey		Timber	Timber floor support east of track [21]	1.26m	6
WYM 07	23	3D Survey		Timber	Timber floor support east of track [21]	1.26m	6
WYM 07	24	3D Survey		Timber	Timber floor support	1.26m	5
WYM 07	25	3D Survey		Timber	Timber floor support		5
WYM 07	26	3D Survey		Timber	Timber floor support	1.29m	
WYM 07	27	3D Survey		Timber	Timber floor support		5
WYM 07	28	3D Survey		Metal	Metal stanchion for vertical timber beam	1.69m	5
WYM 07	29	3D Survey		Pipe	Ceramic pipe aligned E/W	1.13m	6
WYM 07	30	3D Survey		Cut	Bedding layer cut [86]		5

WYM 07	31	3D Survey		Masonry	Furnace, one of 4 aligned E/W	1.50m	5
WYM 07	32	3D Survey		Masonry	Furnace, one of 4 aligned E/W	1.46m	5
WYM 07	33	3D Survey		Masonry	Furnace, one of 4 aligned E/W		5
WYM 07	34	3D Survey		Masonry	Brick surface butts [33]		
WYM 07	35	3D Survey		Surface	Very compacted industrial floor		5
WYM 07	36	3D Survey		Timber	Timber floor support N/S	1.47m	5
WYM 07	37			Timber	One of a pair [36] floor support	1.44m	5
WYM 07	38	38 & 3D survey		Masonry	Furnace, one of 4 aligned E/W	1.50m	5
WYM 07	39			Fill	Backfill of [38]	1.50m	6
WYM 07	40			Fill	Primary fill of [38]		6
WYM 07	41	3D Survey		Base	Alluvium base of furnace		4
WYM 07	42			Cut	cut for [38]		5
WYM 07	43	3D Survey		Surface	Very compacted industrial floor		5
WYM 07	44	3D Survey		Cut	Cut for possible machine base		6
WYM 07	45	3D Survey		Cut	Cut of pit / removal of machinery		6
WYM 07	46	3D Survey		Masonry	Base ,use unknown	1.37m	5
WYM 07	47	3D Survey		Metal	Metal plate sits to south of [38]	1.40m	5
WYM 07	48	3D Survey		Surface	Very compacted industrial floor	1,40m	5
WYM 07	49	3D Survey		Metal	Metal base plate	1.46m	5
WYM 07	50	3D Survey		Metal	Metal stanchion for vertical timber beam	1.67m	5
WYM 07	51	3D Survey		Timber	One of a pair [52]	1.30m	5
WYM 07	52	3D Survey		Timber	One of a pair [51]	1.30m	5
WYM 07	53	3D Survey		Timber	Part of timber floor, structure [53]	1.45m	6
WYM 07	54	3D Survey		Timber	E/W timber, floor support	1.51m	5
WYM 07	55	3D Survey		Timber	E/W timber, floor support	1.57m	5
WYM 07	56	3D Survey		Masonry	Brick manhole with metal lid	1.28m	6
WYM 07	57	3D Survey		Metal	Metal stanchion for vertical timber beam	1.71m	5
WYM 07	58	3D Survey		Metal	Metal pipe associated with furnace [38]		5
WYM 07	59	3D Survey		Surface	Flagstone surface	1.43m	6
WYM 07	60	3D Survey		Surface	Red ceramic floor tiles	1.40m	6
WYM 07	61	3D Survey		Stone	Machine base	1.40m	5
WYM 07	62	3D Survey		Timber	Part of timber floor, structure	1.46m	5
WYM 07	63	3D Survey		Masonry	Brick manhole with metal lid	1.52m	6
WYM 07	64	3D Survey		Surface	Flagstone / Yorkstone floor surface	1.36m	6
WYM 07	65	65 & 3D Survey		Concrete	Foundation for early turntable	1.42m	6

WYM 07	66	3D Survey		Timber	Large timber beam / machine base	1.32m	5
WYM 07	67	3D Survey		Timber	Large timber beam / machine base		5
WYM 07	68	3D Survey		Timber	Same as [66] truncated to the west	1.25m	5
WYM 07	69	3D Survey		Timber	Same as [68]		5
WYM 07	70	3D Survey		Metal	Cast iron machine base	1.37m	5
WYM 07	71	65 & 3D Survey		Timber	Radiating timbers of turntable	1.47m	5
WYM 07	72	65 & 3D Survey		Masonry	Circular brick surround / turntable	1.62m	5
WYM 07	73	3D Survey		Fill	Fill between timbers [71]	1.58m	6
WYM 07	74	3D Survey		Surface	Very compacted industrial floor		5
WYM 07	75	3D Survey		Masonry	Brick base		5
WYM 07	76	3D Survey		Fill	Fill of [77]		
WYM 07	77	3D Survey		Cut	Cut for timbers [68] [69] & [78]		6
WYM 07	78	3D Survey		Timber	Timber support for metal base [70]		5
WYM 07	79	3D Survey		Masonry	Brick base for metal stanchion	1.39m	5
WYM 07	80	3D Survey		Surface	Red and yellow brick floor	1.36m	6
WYM 07	81	3D Survey		Metal	Cast iron stanchion for vertical timber	1.65m	5
WYM 07	82	3D Survey		Concrete	Concrete machine base	1.82m	7
WYM 07	83	3D Survey		Masonry	E/W wall, south wall north workshop	1.45m	5
WYM 07	84	3D Survey		Masonry	E/W wall, north wall middle workshop	1.89m	6
WYM 07	85	3D Survey		Fill	Fill of cut [45]	1.77m	6
WYM 07	86	3D Survey		Fill	Fill of cut [30]		6
WYM 07	87	3D Survey		Fill	Fill of cut [44]		6
WYM 07	88	3D Survey		Masonry	Square brick base	1.74m	
WYM 07	89	3D Survey		Masonry	E/W wall foundations	1.86m	
WYM 07	90	3D Survey		Cut	Construction cut for [89]	1.83m	6
WYM 07	91	3D Survey		Masonry	Structure [213,] [92], [96] & [98]	1.79m	6
WYM 07	92	3D Survey		Stone	Worked stone for possible wheel	1.46m	5
WYM 07	93	3D Survey		Rail track	Early rail track, truncated	1.55m	5
WYM 07	94	3D Survey		Masonry	Manhole access to brick culvert	1.26m	5
WYM 07	95	3D Survey		Surface	Very compacted industrial floor	1.55m	5
WYM 07	96	3D Survey		Surface	Mortared floor related to Structure [213]	1.37m	
WYM 07	97	3D Survey		Fill	Backfill to structure [213]	1.97m	6
WYM 07	98	3D Survey		Cut	Construction cut for [213]	1.52m	
WYM 07	99	3D Survey		Metal	Small metal tank	1.63m	6
WYM 07	100	3D Survey		Surface	Very compacted industrial floor	1.40m	5

WYM 07	101	3D Survey		Stone	Grindstone		6
WYM 07	102	3D Survey		Masonry	North south wall	2.10m	7
WYM 07	103	3D Survey		Masonry	E/W wall of southern workshop	1.80m	5
WYM 07	104	3D Survey		Masonry	E/W wall parallel to [103]	1.61m	5
WYM 07	105	3D Survey		Masonry	Brick culvert between walls [103] & [104]	1.78m	6
WYM 07	106	3D Survey		Masonry	Manhole access to brick culvert [105]	1.78m	5
WYM 07	107	3D Survey		Stone	Yellow sandstone machine base	1.89m	5
WYM 07	108	3D Survey		Masonry	Red brick possible repair to [107]	1.89m	6
WYM 07	109	3D Survey		Stone	Rectangular yellow sandstone base	1.46m	5
WYM 07	110	3D Survey		Metal	Metal stanchion for vertical timber beam	1.88m	5
WYM 07	111	3D Survey		Masonry	Brick base for metal stanchion [110]	1.58m	5
WYM 07	112	3D Survey		Surface	Metal layer over compacted earth floor	1.41m	5
WYM 07	113	3D Survey		Fill	Below floor bedding make up	1.41m	5
WYM 07	114	3D Survey		Cut	Caused by the removal of machinery	1.41m	6
WYM 07	115	3D Survey		Masonry	N/S wall, foundation of southern workshop	1.73m	
WYM 07	116	3D Survey		Concrete	Machine base	1.82m	
WYM 07	117	3D Survey		Cut	Beam slot	1.41m	5
WYM 07	118	3D Survey		Fill	Fill of cut [117]	1.41m	5
WYM 07	119	3D Survey		Masonry	Brick base for metal stanchion	1.50m	5
WYM 07	120	3D Survey		Surface	Working surface area	1.49m	5
WYM 07	121	3D Survey		Cut	Pit possible from machine removal	1.49m	6
WYM 07	122	3D Survey		Timber	Under floor support timber	1.40m	5
WYM 07	123	3D Survey		Masonry	Brick base	1.46m	5
WYM 07	124	3D Survey		Metal	Metal plate on [119]	1.50m	
WYM 07	125	3D Survey		Masonry	Brick base	1.65m	
WYM 07	126	3D Survey		Masonry	Brick base	1.78m	
WYM 07	127	3D Survey		Surface	Slate and earth floor on [123]	1.50m	
WYM 07	128	3D Survey		Masonry	Slate and earth floor	1.42m	5
WYM 07	129	3D Survey		Timber	E/W timber floor support	1.42m	5
WYM 07	130	3D Survey		Timber	N/S timber floor support	1.38m	5
WYM 07	131	3D Survey		Metal	E/W metal pipe	1.54m	
WYM 07	132	3D Survey		Timber	N/S timber floor support	1.38m	5
WYM 07	133	3D Survey		Masonry	Concrete base	1.81m	8
WYM 07	134	3D Survey		Timber	Timber floor support	1.36m	5
WYM 07	135	3D Survey		Concrete	Concrete base	1.49m	8

WYM 07	136	3D Survey		Surface	Slate and earth floor	1.49m	
WYM 07	137	3D Survey		Surface	Machine base	1.50m	
WYM 07	138	3D Survey		Fill	Clay lining	1.48m	
WYM 07	139	3D Survey		Metal	Track leading to turntable [10]	2.10m	7
WYM 07	140	3D Survey		Masonry	Floor support	1.44m	5
WYM 07	141	3D Survey		Masonry	Brick base	1.78m	6
WYM 07	142	3D Survey		Masonry	Brick base	1.70m	5
WYM 07	143	3D Survey		Concrete	Concrete base		6
WYM 07	144	3D Survey		Surface	Metalled floor surface	1.29m	5
WYM 07	145	3D Survey		Masonry	Late wall foundation	1.73m	
WYM 07	146	263 & 3D Survey		Masonry	Brick flue structure number [263]	1.52m	5
WYM 07	147	3D Survey		Masonry	Structure [263]	1.57m	5
WYM 07	148	3D Survey		Masonry	Structure [263]	1.67m	5
WYM 07	149	3D Survey		Metal	Stanchion base for vertical timber	1.74m	5
WYM 07	150	3D Survey		Metal	One of five aligned E/W	1.73m	5
WYM 07	151	3D Survey		Metal	Stanchion base for vertical timber	1.34m	5
WYM 07	152	3D Survey		Metal	Metal fixing on chalk base [153] [169]	1.34m	5
WYM 07	153	3D Survey		Chalk	Chalk base same as [169]	1.34m	5
WYM 07	154	3D Survey		Concrete	Concrete base with metal fixings	1.92m	8
WYM 07	155	3D Survey		Masonry	Brick base	1.88m	
WYM 07	156	3D Survey		Concrete	Concrete base with metal fixings	1.88m	8
WYM 07	157	3D Survey		Masonry	Brick base	1.67m	6
WYM 07	158	3D Survey		Surface	Earth floor	1.35m	5
WYM 07	159	3D Survey		Masonry	Seen below floor [158]	1.26m	5
WYM 07	160	3D Survey		Masonry	Brick base for metal stanchion [150]	1.41m	5
WYM 07	161	3D Survey		Masonry	Base made of mortared rubble	1.85m	
WYM 07	162	3D Survey		Layer	Under floor layer	1.29m	5
WYM 07	163	3D Survey		Surface	Beaten earth floor	1.32m	5
WYM 07	164	3D Survey		Metal	Metal machine base	1.39m	5
WYM 07	165	3D Survey		Surface	Brick ,mortar &slate floor	1.26m	5
WYM 07	166	3D Survey		Timber	N/S timber floor support		5
WYM 07	167	3D Survey		Metal	Metal bar with wood supports	1.09m	
WYM 07	168	3D Survey		Layer	Demolition layer around culvert [105]	1.73m	6
WYM 07	169	3D Survey		Chalk	Chalk base same as [153]	1.34m	5
WYM 07	170	3D Survey		Stone	Sandstone block running into L.O.E.	1.71m	5

WYM 07	171	3D Survey		Drain	N/S ceramic pipe	1.86m	6
WYM 07	172	3D Survey		Manhole	Access to pipe [171]	1.60m	
WYM 07	173	3D Survey		Metal	Lid from manhole [172]	1.64m	
WYM 07	174	3D Survey		Concrete	Base with metal fixings	1.86m	8
WYM 07	175	3D Survey		Masonry	Part of flue, structure [263]	1.59m	5
WYM 07	176	3D Survey		Masonry	Part of drain	1.14m	5
WYM 07	177	3D Survey		Masonry	Part of flue, structure [263]		5
WYM 07	178	3D Survey		Cut	Part of flue, structure [263]	1.31m	5
WYM 07	179	3D Survey		Concrete	Concrete block used to fill void	1.90m	6
WYM 07	180	3D Survey		Surface	Floor surface	1.32m	5
WYM 07	181	3D Survey		Surface	Earth floor	1.35m	5
WYM 07	182	3D Survey		Surface	Compacted earth floor	1.46m	5
WYM 07	183	3D Survey		Masonry	Floor of flue structure [263]	1.22m	5
WYM 07	184	3D Survey		Masonry	Part of structure [263]	1.62m	5
WYM 07	185	3D Survey		Masonry	Single line brick, pos floor support	1.22m	5
WYM 07	186	3D Survey		Masonry	Brick base under floor [187]	1.23m	5
WYM 07	187	3D Survey		Surface	Earth floor	1.23m	5
WYM 07	188	3D Survey		Fill	Backfill of [175]	1.59m	6
WYM 07	189	3D Survey		Fill	Fill of flue /furnace [263]	1.51m	5
WYM 07	190	3D Survey		Metal Pipe	Metal Pipe		5
WYM 07	191	3D Survey		Layer	Redeposited gravel	1.40m	
WYM 07	192	3D Survey		Concrete	Concrete base with metal fixing	1.86m	8
WYM 07	193	3D Survey		Layer	Re deposited clay	1.26	
WYM 07	194	3D Survey		Layer	Made ground south east area		
WYM 07	195	3D Survey		Layer	Same as [194]		
WYM 07	196	3D Survey		Masonry	E/W wall [373] (89)	1.83	6
WYM 07	197	3D Survey		Masonry	Part of flue / furnace [263]	1.14	5
WYM 07	198	198 & 3D Survey		Structure	Large metal and brick flue?	1.46	5
WYM 07	199	3D Survey		Masonry	Part of structure [198]	1.41	5
WYM 07	200	3D Survey		Masonry	N/S wall with E/W turn, over [198]	1.46	6
WYM 07	201	3D Survey		Surface	Metalled industrial floor	1.37	5
WYM 07	202	3D Survey		Surface	Brick floor surface	1.22	6
WYM 07	203	3D Survey		Surface	Metalled industrial floor	1.38	5
WYM 07	204	3D Survey		Surface	Metalled industrial floor	1.34	5
WYM 07	205	3D Survey		Surface	Rough ragstone and brick floor	1.34	5

WYM 07	206	3D Survey		Metal	E/W metal stanchions [211] [212]	1.69	5
WYM 07	207	3D Survey		Concrete	Concrete base sits on [208]	1.78	8
WYM 07	208	3D Survey		Masonry	Wall one of four related to structure [213]	1.78	6
WYM 07	209	3D Survey		Masonry	Wall one of four related to structure [213]	1.77	7
WYM 07	210	3D Survey		Surface	Brick floor associated with [213]	1.35	5
WYM 07	211	3D Survey		Metal	Metal stanchion for vertical timber beam	1.69	5
WYM 07	212	3D Survey		Metal	Metal stanchion for vertical timber beam	1.69	5
WYM 07	213	3D Survey		Structure	Red brick structure, tank	1.76	7
WYM 07	214	3D Survey		Stone	Sand stone block, displaced	1.83	5
WYM 07	215	3D Survey		Masonry	N/S red brick wall foundations	1.31	
WYM 07	216	3D Survey		Surface	Earth and timber floor	1.28	5
WYM 07	217	3D Survey		Masonry	E/W red brick wall	1.22	5
WYM 07	218	3D Survey		Masonry	Small D shaped ring butts [198]	1.15	5
WYM 07	219	3D Survey		Concrete	One of five N/S	1.07	5
WYM 07	220	3D Survey		Concrete	E/W Machine base, one of five [225] [226] [228] [229]	1.29	7
WYM 07	221	3D Survey		Surface	Brick base with earth and slate surface	1.29	5
WYM 07	222			Void			
WYM 07	223	3D Survey		Concrete	Same as [82] pair concrete blocks,	1.69	
WYM 07	224	3D Survey		Metal	Metal tank between [82] & [223]	1.69	
WYM 07	225	3D Survey		Concrete	E/W machine base, one of five [220] [226] [228] [229]	1.23	7
WYM 07	226	3D Survey		Concrete	E/W machine base, one of five [220] [225] [228] [229]	1.23	7
WYM 07	227	3D Survey		Concrete	Machine base	1.38	5
WYM 07	228	3D Survey		Concrete	E/W machine base, one of five [220] [225] [226] [229]	1.38	7
WYM 07	229	3D Survey		Concrete	E/W machine base, one of five [220] [225] [226] [228]	1.38	7
WYM 07	230	3D Survey		Surface	Thick compacted metal surface	1.33	5
WYM 07	231	3D Survey		Surface	Brick and mortared surface	1.26	
WYM 07	232	3D Survey		Masonry	One of pair south side of [213]	1.75	7
WYM 07	233	3D Survey		Masonry	One of pair south side of [213]	1.77	7
WYM 07	234	3D Survey		Concrete	Sits on [233] & [232]	1.8	8
WYM 07	235	E-Val Trench[2]	2	Layer	Naturally deposited alluvium	0.92	4
WYM 07	236	E-Val Trench[2]	2	Layer	Thin layer of peat	0.04	2
WYM 07	237	E-Val Trench[2]	2	Layer	Natural sand	-0.28	1

WYM 07	238	E-Val Trench[2]	2	Fill	Fill of cut [239]	-0.11	3
WYM 07	239	E-Val Trench[2]	2	Cut	Possibly tree bowl / pit	-0.11	3
WYM 07	240	E-Val Trench[2]	2	Layer	Sub soil, predates peat	-0.18	1
WYM 07	241	E-Val Trench[2]	2	Layer	Natural disturbance of sand	-0.34	1
WYM 07	242	E-Val Trench[2]	2	Fill	Fill of channel [243]	-0.06	3
WYM 07	243	E-Val Trench[2]	2	Cut	Possible channel, Prehistoric	-0.06	3
WYM 07	244	3D Survey		Masonry	Brick surface under [212]	1.37	5
WYM 07	245	3D Survey		Drain	N/S ceramic pipe	1.83	7
WYM 07	246	3D Survey		Metal	Pipe seen to run under [245]	1.63	
WYM 07	247	3D Survey		Drain	N/S ceramic pipe	1.22	6
WYM 07	248	3D Survey		Masonry	Brick between [248] & [208]	1.78	
WYM 07	249	3D Survey		Stone	Yellow Sandstone machine base	1.44	5
WYM 07	250	3D Survey		Surface	Metalled industrial floor	1.15	5
WYM 07	251	3D Survey		Metal	Metal stanchion for vertical timber beam	1.69	5
WYM 07	252	3D Survey		Concrete	Large concrete tank		8
WYM 07	253	3D Survey		Structure	Northern workshop		
WYM 07	254	3D Survey		Group	D shaped furnaces		5
WYM 07	255	3D Survey		Surface	Brick surface north workshop		7
WYM 07	256	3D Survey		Surface	Brick floor surface	1.64	5
WYM 07	257	3D Survey		Concrete	Base with shallow gully	1.71	8
WYM 07	258	3D Survey		Timbers	Pair of parallel timbers	1.35	5
WYM 07	259	3D Survey		Metal pipe	Drain or pipe runs E/W and relates to [2]	1.35	5
WYM 07	260	3D Survey		Concrete	Square Concrete Tank	2.03	8
WYM 07	261	3D Survey		Concrete	Base		7
WYM 07	262	3D Survey		Concrete	Fire brick and concrete flue same as [7]	1.46	7
WYM 07	263	3D Survey		Structure	Brick flue E/W	1.57	5
WYM 07	264	3D Survey		Metal	Stanchion base for vertical timber	1.74	5
WYM 07	265	3D Survey		Masonry	E/W wall	1.42	6
WYM 07	266	3D Survey		Concrete	Footing	1.39	8
WYM 07	267	3D Survey		Metal	Stanchion base for vertical timber	1.66	5
WYM 07	268	3D Survey		Masonry	E/W footing	1.07	
WYM 07	269	3D Survey		Concrete	Ground beam	1.96	8
WYM 07	270			Void			
WYM 07	271	3D Survey		Masonry	E/W return of [272]	1.42	5
WYM 07	272	3D Survey		Masonry	Footings part of [271]	1.56	6

WYM 07	273	3D Survey		Masonry	E/W wall footings	1.04	
WYM 07	274	3D Survey		Masonry	N/S footings, late addition to [268]	1.09	6
WYM 07	275	3D Survey		Concrete	Concrete base	1.31	
WYM 07	276	3D Survey		Concrete	Concrete ground beam	1.93	8
WYM 07	277	3D Survey		Concrete	Ground beam	1.97	7
WYM 07	278	3D Survey		Concrete	Concrete base	1.42	7
WYM 07	279	3D Survey		Surface	Compacted metal surface	1.32	5
WYM 07	280	3D Survey		Surface	Compacted metal surface	1.6	5
WYM 07	281	3D Survey		Concrete	Ground beam same as [269]	1.96	8
WYM 07	282	3D Survey		Concrete	Concrete base	1.77	8
WYM 07	283	3D Survey		Concrete	Concrete base	1.34	8
WYM 07	284	3D Survey		Masonry	Same as [283]	1.31	8
WYM 07	285	3D Survey		Concrete	Concrete base	1.11	8
WYM 07	286	3D Survey		Layer	Levelling layer	1.3	
WYM 07	287	3D Survey		Fill	Backfill of [288]	1.45	
WYM 07	288	3D Survey		Cut	Possible flue feeding [274]	1.45	
WYM 07	289	3D Survey		Fill	Fill of [290]	1.41	
WYM 07	290	3D Survey		Cut	Drain cut	1.41	
WYM 07	291	3D Survey		Metal	Cast iron plate over [288]	1.38	
WYM 07	292	3D Survey		Concrete	Base same as [293] & [281]	1.97	8
WYM 07	293	3D Survey		Concrete	Base	1.91	8
WYM 07	294	3D Survey		Fill	Backfill of [295]	1.08	
WYM 07	295	3D Survey		Cut	Cut for E/W wall [268]	1.08	
WYM 07	293	3D Survey		Concrete	Base	1.91	8
WYM 07	293	3D Survey		Concrete	Base	1.91	8
WYM 07	298	3D Survey		fill	Fill of cut [300] for stanchion [267]	1.27	5
WYM 07	299	3D Survey		Masonry	N/S wall footings	1.19	
WYM 07	300	3D Survey		Cut	Shallow cut, fill [298]	1.27	
WYM 07	301	3D Survey		Fill	Backfill between [306] &[198]	1.38	
WYM 07	302	3D Survey		Fill	Fill of linear cut [303]	1.17	
WYM 07	303	3D Survey		Cut	Linear cut	1.17	
WYM 07	304	3D Survey		Stone	Machine block	1.39	5
WYM 07	305	3D Survey		Masonry	N/S wall footings	1.4	5
WYM 07	306	3D Survey		Masonry	N/S wall butts [265]	1.38	6
WYM 07	307	3D Survey		Masonry	Wall footings butts [306]	1.35	6

WYM 07	308	3D Survey		Concrete	Concrete wall footings	1.34	7
WYM 07	309	3D Survey		Fill	Backfill between walls [308] & [305]	1.33	
WYM 07	310	3D Survey		Cut	Construction cut for [305]	1.33	
WYM 07	311	3D Survey		Masonry	E/W wall footings	1.29	
WYM 07	312	3D Survey		Stone	Grindstone associated with [304]		
WYM 07	313	3D Survey		Fill	Backfill to [314]	1.4	
WYM 07	314	3D Survey		Cut	Small rectangular cut	1.4	
WYM 07	315	3D Survey		Masonry	Butts [265]	1.4	6
WYM 07	316	3D Survey		Masonry	Brick base for [198]	1.39	5
WYM 07	317	3D Survey		Layer	Rough surface	1.22	
WYM 07	318	3D Survey		Masonry	Footings truncated by [304]	1.35	
WYM 07	319	3D Survey		Concrete	Base	1.35	8
WYM 07	320	3D Survey		Fill	Fill of [321]	1.16	
WYM 07	321	3D Survey		Cut	Rectangular cut	1.16	
WYM 07	322	3D Survey		Fill	Redeposited clay fill of cut [321]	1.16	6
WYM 07	323	3D Survey		Cut	Cut, truncated by concrete base [319]	1.16	
WYM 07	324	3D Survey		Surface	Concrete and rubble surface	1.37	6
WYM 07	325	3D Survey		Concrete	Concrete base with remains of sandstone	1.18	6
WYM 07	326	3D Survey		Concrete	Concrete base / footing	1.37	
WYM 07	327	3D Survey		Timber	N/S Timber beam	1.13	5
WYM 07	328	3D Survey		Timber	Support for rails parallel to [327]	1.13	5
WYM 07	329	3D Survey		Timber	Support for rails parallel to [327]	1.17	5
WYM 07	330	3D Survey		Timber	Support for rails parallel to [328]	1.22	5
WYM 07	331	3D Survey		Metal	Metal plate 1 inch thick	1.39	5
WYM 07	332	3D Survey		Metal	Metal pipe over [331]	1.59	5
WYM 07	333	3D Survey		Drain	N/S ceramic pipe	1.64	6
WYM 07	334	3D Survey		Cut	Cut for drain [333]	1.64	6
WYM 07	335	3D Survey		Drain	Ceramic pipe with concrete cap	2.15	7
WYM 07	336	3D Survey		Cut	Cut for [335]	1.53	6
WYM 07	337	3D Survey		Masonry	Brick culvert	1.66	5
WYM 07	338	3D Survey		Surface	Bricks on edge of floor	1.58	6
WYM 07	339	3D Survey		Surface	Same as [338]	1.66	6
WYM 07	340	3D Survey		Masonry	Floor of small workroom	1.66	6
WYM 07	341	3D Survey		Masonry	Same as [342] & [343]	1.56	6
WYM 07	342	3D Survey		Masonry	Same as [341] & [343]	1.57	6

WYM 07	343	3D Survey		Masonry	Edging to floor [342]	1.58	6
WYM 07	344	3D Survey		Masonry	Wall with E/W return	1.74	6
WYM 07	345			Void			
WYM 07	346			Void			
WYM 07	347			Void			
WYM 07	348			Void			
WYM 07	349			Void			
WYM 07	350			Void			
WYM 07	351	3D Survey		Layer	Bedding for floor [341] [342] [343]	1.55	5
WYM 07	352	3D Survey		Timber	Fill of [353]	1.18	5
WYM 07	353	3D Survey		Cut	N/S linear cut	1.18	5
WYM 07	354	3D Survey		Timber	Fill of [355]	1.18	5
WYM 07	355	3D Survey		Cut	N/S linear cut	1.18	
WYM 07	356	3D Survey		Fill	Fill of [357]	1.17	
WYM 07	357	3D Survey		Cut	N/S linear cut	1.17	
WYM 07	358	3D Survey		Layer	Levelling layer	1.52	
WYM 07	359	3D Survey		Surface	Earth surface, appears burnt	1.41	5
WYM 07	360	3D Survey		Layer	Dumped deposit	1.41	
WYM 07	361	3D Survey		Layer	Dumped deposit	1.24	
WYM 07	362	3D Survey		Fill	Primary fill of cut [364]	0.91	
WYM 07	363	3D Survey		Fill	Backfill to cut [364]	1.54	
WYM 07	364	3D Survey		Cut	Cut for drain	1.54	
WYM 07	365	3D Survey		Layer	Bedding layer below timbers [333]	1.17	5
WYM 07	366	3D Survey		Layer	Trample layer overlies alluvium	1.29	5
WYM 07	367			Void			
WYM 07	368			Void			
WYM 07	369	3D Survey		Masonry	Butts to inside of culvert [337]	1.58	7
WYM 07	370	3D Survey		Masonry	Edging to floor [338] [341] [342]	1.58	6
WYM 07	371	3D Survey		Masonry	Same as [339]	1.66	
WYM 07	372	3D Survey		Concrete	Concrete with metal H fixing	2.04	8
WYM 07	373	3D Survey		Masonry	E/W workshop wall	8.46	
WYM 07	374	3D Survey		Cut	Construction cut for wall [373]	1.58	6
WYM 07	375	3D Survey		Layer	Dumped deposit	1.61	6
WYM 07	376	3D Survey		Fill	Backfill to cut [377]	1.63	6
WYM 07	377	3D Survey		Metal	Down pipe leads to cistern [337]	1.32	

WYM 07	378	3D Survey		Cut	Cut for pipe [377]	1.63	6
WYM 07	379	3D Survey		Fill	Backfill of wall cut [373]	1.57	6
WYM 07	380	3D Survey		Concrete	Ground beam with metal fixings	1.87	6
WYM 07	381	3D Survey		Metal	Stanchion with wall [373] built around it	5.9	5
WYM 07	382	3D Survey		Metal	Stanchion with wall [373] built around it	1.56	5
WYM 07	383	3D Survey		Timber	Located in [366]		5
WYM 07	384	3D Survey		Timber	Removed by machine		5
WYM 07	385	3D Survey		Concrete	Foundation	1.33	6
WYM 07	386	3D Survey		Fill	Infill to [198]	1.35	6
WYM 07	387	3D Survey		Stone	Yellow sand stone over flue [388]	1.98	5
WYM 07	388	3D Survey		Masonry	Part of brick flue	1.78	6
WYM 07	389	3D Survey		Masonry	Brick flue with metal cover	1.52	5
WYM 07	390	3D Survey		Masonry	Well / Water tank	1.52	7
WYM 07	391	3D Survey		Metal	Metal cover from flue [389]	1.28	5
WYM 07	392	3D Survey		Fill	Construction backfill	1.5	6
WYM 07	393	3D Survey		Metal pipe	Runs into flue		
WYM 07	394	3D Survey		Metal pipe	Truncated by [390]		6
WYM 07	395	3D Survey		Layer	Alluvium		6
WYM 07	396	3D Survey		Cut	Cut for pipe [394]		
WYM 07	397	3D Survey		Cut	Cut for [388]		
WYM 07	398	void		Void			
WYM 07	399	3D Survey		Fill	Construction backfill	1.5	
WYM 07	400	3D Survey		Fill	Construction backfill		
WYM 07	401	3D Survey		Masonry	Rectangular tank	1.4	8
WYM 07	402	3D Survey		Surface	Remains of compact earth floor	1.44	5
WYM 07	403	3D Survey		Masonry	Brick base	1.68	
WYM 07	404	3D Survey		Layer	Thick slag deposit on metal plate	1.33	6
WYM 07	405	3D Survey		Layer	Naturally deposited alluvium	0.99	4
WYM 07	406	3D Survey		Masonry	Base keyed into [410]	1.31	5
WYM 07	407	3D Survey		Masonry	N/S wall	1.7	5
WYM 07	408	3D Survey		Masonry	Blocked doorway	1.7	6
WYM 07	409	3D Survey		Masonry	N/S wall next to structure [310]	1.53	5
WYM 07	410	3D Survey		Masonry	Furnace /flue, one of a pair N/S	1.66	5
WYM 07	411	3D Survey		Surface	Brick floor surface	0.8	5
WYM 07	412	3D Survey		Surface	Truncated brick floor surface	1.2	5

WYM 07	413	3D Survey		Metal	Metal plate 1 inch thick	1.43	6
WYM 07	414	3D Survey		Masonry	N/S wall runs into [415]	1.2	5
WYM 07	415	3D Survey		Masonry	Possible manhole	1.41	6
WYM 07	416	3D Survey		Surface	Brick floor surface	1.29	5
WYM 07	417	3D Survey		Metal	Metal pipe runs between furnaces	1.19	5
WYM 07	418	3D Survey		Masonry	Furnace one of a pair N/S	1.63	5
WYM 07	419	3D Survey		Masonry	Western wall of north workshop	1.81	5
WYM 07	420	3D Survey		Masonry	Pair single brick walls with pipe in centre	1.56	5
WYM 07	421	3D Survey		Masonry	Brick wall /base	1.54	
WYM 07	422	3D Survey		Surface	Brick floor butts [423]	1.19	5
WYM 07	423	3D Survey		Masonry	Part of brick furnace [418]	1.6	5
WYM 07	424	3D Survey		Metal	Compacted build up of metal flakes	1.31	5
WYM 07	425	3D Survey		Metal	Metal stanchion on south wall [409]	1.77	5
WYM 07	426	3D Survey		Concrete	Concrete ground beam	1.77	8
WYM 07	427	3D Survey		Masonry	Brick floor	1.74	5
WYM 07	428	3D Survey		Fill	Backfill	1.66	
	429						
WYM 07	430	430 & Pile Pit 40-42	Section 8	Surface	Brick floor surface	1.85	7
WYM 07	431	Pile Pit 40-42	Section 8	Layer	Iron rich layer	1.75	
WYM 07	432	Pile Pit 40-42	Section 8	Surface	Metalled industrial floor	1.5	5
WYM 07	433	Pile Pit 40-42	Section 8	Natural	Naturally deposited alluvium	1.3	
WYM 07	434	Pile Pit 34-39	Section 7	Layer	Black silt / frequent charcoal	1.95	
WYM 07	435	Pile Pit 34-39	Section 7	Layer	Iron rich layer / frequent iron slag	1.75	
WYM 07	436	Pile Pit 34-39	Section 7	Layer	Naturally deposited alluvium	1.4	4
WYM 07	437	Pile Pit 31-33	Section 9	Pipe	Large ceramic pipe/ blast pipe	1.95	7
WYM 07	438	Pile Pit 31-33	Section 9	Layer	Black silt / frequent charcoal	2	
WYM 07	439	Pile Pit 31-33	Section 9	Layer	Dark grey gravelly layer	1.65	
WYM 07	440	Pile Pit 31-33	Section 9	Surface	Metalled industrial floor	1.35	5
WYM 07	441	Pile Pit 31-33	Section 9	Layer	Dark gravel / charcoal rich layer	1.2	
WYM 07	442	Pile Pit 31-33	Section 9	Layer	Naturally deposited alluvium	1.1	4
WYM 07	443	Pile Pit 28-30	Section 10	Layer	Black silt / frequent charcoal	2	
WYM 07	444	Pile Pit 28-30	Section 10	Layer	Iron rich layer / frequent iron slag	1.7	
WYM 07	445	Pile Pit 28-30	Section 10	Surface	Naturally deposited alluvium	1.1	4
WYM 07	446	Pile Pit 22-24	Section 11	Concrete	Concrete foundation base	2.02	8
WYM 07	447	Pile Pit 22-24	Section 11	Layer	Bedding Layer	2.02	

WYM 07	448	Pile Pit 22-24	Section 11	Fill	Fill of cut [450]	2	
WYM 07	449	Pile Pit 22-24	Section 11	Pipe	Large ceramic pipe/ blast pipe	1.93	7
WYM 07	450	Pile Pit 22-24	Section 11	Cut	Cut for pipe [449]	2	7
WYM 07	451	Pile Pit 22-24	Section 11	Layer	Demolition layer	1.95	
WYM 07	452	Pile Pit 22-24	Section 11	Layer	Metalled industrial floor	1.48	5
WYM 07	453	Pile Pit 22-24	Section 11	Layer	Ash and clinker deposit	1.43	
WYM 07	454	Pile Pit 22-24	Section 11	Layer	Naturally deposited alluvium	1.25	4
WYM 07	455	Pile Pit 25-27	Section 12	Layer	Demolition layer	1.9	
WYM 07	456	Pile Pit 25-27	Section 12	Surface	Metalled industrial floor	1.17	5
WYM 07	457	Pile Pit 25-27	Section 12	Layer	Clay layer	1.25	
WYM 07	458	Pile Pit 25-27	Section 12	Layer	Naturally deposited alluvium	1.17	6
WYM 07	459	Pile Pit 77-85	Section 13	Layer	Demolition layer	2.02	
WYM 07	460	Pile Pit 77-85	Section 13	Pipe	NW/SE small ceramic pipe	1.55	7
WYM 07	461	Pile Pit 77-85	Section 13	Concrete	Concrete foundation base	2.1	8
WYM 07	462	Pile Pit 77-85	Section 13	Pipe	Large ceramic pipe/ blast pipe	1.5	7
WYM 07	463	Pile Pit 77-85	Section 13	Pipe	N/S small ceramic pipe	1.5	7
WYM 07	464	Pile Pit 77-85	Section 13	Layer	Demolition layer	1.65	
WYM 07	465	Pile Pit 77-85	Section 13	Masonry	Brick structure flue / furnace	1.52	5
WYM 07	466	Pile Pit 77-85		Pipe	Metal / iron pipe	1.9	
WYM 07	467	Pile Pit 77-85	Section 13	Layer	Naturally deposited alluvium	1.1	4
WYM 07	468	Pile Pit 74-76	Section 14	Layer	Demolition layer	2	
WYM 07	469	Pile Pit 74-76	Section 14	Timber	Support beam	2	5
WYM 07	470	Pile Pit 74-76	Section 14	Layer	Bedding layer	1.55	5
WYM 07	471	Pile Pit 74-76	Section 14	Layer	Demolition layer	1.5	
WYM 07	472	Pile Pit 74-76	Section 14	Surface	Metalled industrial floor	1.15	5
WYM 07	473	Pile Pit 74-76	Section 14&16	Masonry	Brick pier	1.45	6
WYM 07	474	Pile Pit 74-76	Section 14	Layer	Bedding layer	1.05	5
WYM 07	475	Pile Pit 74-76	Section 14	Layer	Naturally deposited alluvium	0.95	4
WYM 07	476	Pile Pit 74-76	Section 15&16	Masonry	Brick structure	1.4	5
WYM 07	477	Pile Pit 74-76	Section 15	Masonry	Brick flue	1.94	7
WYM 07	478	Pile Pit 74-76	Section 15	Pipe	Iron pipe	1.85	
WYM 07	479	Pile Pit 74-76	Section 15	Layer	Demolition layer	2	
WYM 07	480	Pile Pit 74-76	Section 15	Layer	Brick debris	2	
WYM 07	481	Pile Pit 74-76		Fill	In-fill to [477]	1.88	

WYM 07	482	Pile Pit 74-76	Section 16	Layer	Cinders & ash	1.37	
WYM 07	483	Pile Pit 74-76	Section 16	Layer	Demolition dump	1.31	
WYM 07	484	Pile Pit 74-76	Section 16	Layer	Ash and coal deposit	1.92	
WYM 07	485	Pile Pit 74-76	Section 16	Layer	Brick rubble and fine mortar dump	1.95	
WYM 07	486	Pile Pit 68-70	Section 17	Layer	Demolition Layer	1.96	
WYM 07	487	Pile Pit 68-70	Section 17	Masonry	Brick floor	1.37	6
WYM 07	488	Pile Pit 68-70	Section 17	Layer	Grey gravel layer	1.3	
WYM 07	489	Pile Pit 68-70	Section 17	Layer	Re-deposited clay	1.2	5
WYM 07	490	Pile Pit 68-70	Section 17	Timber	Possible floor support	1.16	5
WYM 07	491	Pile Pit 68-70	Section 17	Layer	Naturally deposited alluvium	1.1	4
WYM 07	492	Pile Pit 68-70	Section 17	Pipe	Iron pipe	1.86	
WYM 07	493	Pile Pit 62-64	Section 18-19	Layer	Demolition layer	2.07	
WYM 07	494	Pile Pit 62-64	Section 18-19	Layer	Clay silt layer	1.88	
WYM 07	495	Pile Pit 62-64	Section 18-19	Layer	Mixed layer	2.04	
WYM 07	496	Pile Pit 62-64	Section 18	Fill	Fill of cut [497]	2.05	
WYM 07	497	Pile Pit 62-64	Section 18	Cut	Construction cut for pipe	2.05	7
WYM 07	498	Pile Pit 62-64	Section 18-21	Surface	Metalled industrial floor	1.64	5
WYM 07	499	Pile Pit 62-64	Section 18-21	Layer	Dark brown fine silt clay	1.64	
WYM 07	500	Pile Pit 62-64	Section 18-21	Surface	Metalled industrial floor	1.55	5
WYM 07	501	Pile Pit 62-64	Section 18-21	Layer	Dark brown fine silt clay	1.5	
WYM 07	502	Pile Pit 62-64	Section 18-21	Surface	Metalled industrial floor	1.51	5
WYM 07	503	Pile Pit 62-64	Section 18-21	Layer	Clay demolition layer	1.48	
WYM 07	504	Pile Pit 62-64	Section 18-21	Layer	Naturally deposited alluvium	1.25	4
WYM 07	505	Pile Pit 62-64	Section 18-20	Fill	Backfill to cut [508]	1.8	
WYM 07	506	Pile Pit 62-64	Section 18-19	Fill	In-fill to [508]	1.62	
WYM 07	507	Pile Pit 62-64	Section 18-19	Pipe	Large ceramic pipe	1.7	7
WYM 07	508	Pile Pit 62-64	Section 18-	Cut	construction cut to [507]	1.8	7

			20				
WYM 07	509	Pile Pit 62-64	Section 19-20	Layer	Iron rich layer	1.58	
WYM 07	510	Pile Pit 62-64	Section 19-20	Surface	Metalled industrial floor	1.52	5
WYM 07	511	Pile Pit 62-64	Section 19-20	Layer	Charcoal and ash layer	1.5	5
WYM 07	512	Pile Pit 62-64	Section 19-20	Surface	Burnt earth floor surface	1.47	5
WYM 07	513	Pile Pit 62-64	Section 19-20	Layer	Charcoal and ash layer	1.4	5
WYM 07	514	Pile Pit 62-64	Section 19-20	Fill	Infill to [514]	1.67	
WYM 07	515	Pile Pit 62-64	Section 19	Pipe	Small ceramic pipe	1.74	7
WYM 07	516	Pile Pit 62-64	Section 19	Cut	Construction cut to [515]	1.72	7
WYM 07	517	Pile Pit 62-64	Section 19	Concrete	Foundation base	2.1	
WYM 07	518	Pile Pit 62-64	Section 19	Timber	Plank / early rail support	1.24	5
WYM 07	519	Pile Pit 62-64	Section 19	Layer	Re-deposited clay	1.25	
WYM 07	520	Pile Pit 62-64	Section 20-21	Fill	Backfill to cut [516]	1.7	
WYM 07	521	Pile Pit 62-64	Section 20-21	Layer	Iron slag layer	2.05	
WYM 07	522	Pile Pit 62-64	Section 19-21	Surface	Metalled industrial floor	1.47	5
WYM 07	523	Pile Pit 62-64	Section 19	Fill	In-fill to [517]	2.1	
WYM 07	524	Pile Pit 62-64	Section 21	Fill	Fill of [525]	2.08	
WYM 07	525	Pile Pit 62-64	Section 21	Cut	Large rectangular cut	2.08	
WYM 07	526	Pile Pit 56-58	Section 22-23	Layer	Made ground / demolition layer	2	
WYM 07	527	Pile Pit 56-58	Section 22-23	Layer	Trample layer	1.62	
WYM 07	528	Pile Pit 56-58	Section 22-23	Layer	Early burnt clay surface	1.41	5
WYM 07	529	Pile Pit 56-58	Section 22-23	Layer	Bedding layer for [548]	1.38	7
WYM 07	530	Pile Pit 56-58	Section 22-23	Layer	Naturally deposited alluvial clay	1.2	4
WYM 07	531	Pile Pit 56-58	Section 22	Pipe	N/S blast pipe	1.55	7
WYM 07	532	Pile Pit 56-58	Section 22	Cut	Construction cut to [531]	2.04	7
WYM 07	533	Pile Pit 56-58	Section 22-25	Fill	Backfill to cut [532]	2.04	7

WYM 07	534	Pile Pit 47-49	Section 26-27	Layer	Made ground	2.05	
WYM 07	535	Pile Pit 47-49	Section 26-27	Layer	Demolition layer	1.43	
WYM 07	536	Pile Pit 47-49	Section 26	Layer	Burnt layer	1.37	5
WYM 07	537	Pile Pit 47-49	Section 27	Layer	Metalled industrial floor	1.2	5
WYM 07	538	Pile Pit 47-49	Section 26	Layer	Clay packing	1.21	
WYM 07	539	Pile Pit 47-49	Section 26-27	Masonry	Circular brick structure	1.43	5
WYM 07	540	Pile Pit 47-49	Section 26	Timber	Timber	1.16	
WYM 07	541	Pile Pit 47-49	Section 26	Layer	Made ground	1.15	
WYM 07	542	Pile Pit 47-49	Section 26	Layer	Naturally deposited alluvial clay	1.1	4
WYM 07	543	Pile Pit 53-55	Section 29	Layer	Levelling layer	2.05	
WYM 07	544	Pile Pit 53-55	Section 28-29	Layer	Metal sheet	1.92	
WYM 07	545	Pile Pit 53-55	Section 28-29	Layer	Demolition layer	1.88	
WYM 07	546	Pile Pit 53-55	Section 28	Fill	Backfill to [549]	1.85	
WYM 07	547	Pile Pit 53-55	Section 28	Fill	In fill	1.6	
WYM 07	548	Pile Pit 53-55	Section 28	Pipe	Blast pipe	1.68	7
WYM 07	549	Pile Pit 53-55	Section 28	Cut	Cut for [548]	1.85	
WYM 07	550	Pile Pit 53-55	Section 29	Surface	Metalled industrial floor	1.55	5
WYM 07	551	Pile Pit 53-55	Section 28-29	Layer	Demolition layer	1.68	
WYM 07	552	Pile Pit 53-55	Section 28	Fill	Backfill of cut [571]	1.5	
WYM 07	553	Pile Pit 53-55	Section 28	Surface	Metalled industrial floor	1.5	5
WYM 07	554	Pile Pit 53-55	Section 28	Layer	Layer clinker / slag	1.55	
WYM 07	555	Pile Pit 53-55	Section 28	Surface	Metalled industrial floor	1.48	5
WYM 07	556	Pile Pit 53-55	Section 28	Fill	Fill of [568]	1.44	
WYM 07	557	Pile Pit 53-55	Section 28	Fill	Fill of [568]	1.38	
WYM 07	558	Pile Pit 53-55	Section 28	Surface	Metalled industrial floor	1.45	5
WYM 07	559	Pile Pit 53-55	Section 28-29	Layer	Naturally deposited alluvial clay	1.35	4
WYM 07	560	Pile Pit 53-55	Section 28	Timber	Timber plank	1.12	
WYM 07	561	Pile Pit 53-55	Section 28	Timber	Timber plank	1.14	
WYM 07	562	Pile Pit 53-55	Section 29	Timber	N/S Timber	1.29	5
WYM 07	563	Pile Pit 53-55	Section 29	Timber	N/S Timber	1.3	5
WYM 07	564	Pile Pit 53-55	Section 29	Timber	N/S Timber	1.29	5

WYM 07	565	Pile Pit 53-55	Section 29	Timber	N/S Timber	1.25	5
WYM 07	566	Pile Pit 53-55	Section 28	Layer	Dumped deposit	1.28	
WYM 07	567	Pile Pit 53-55	Section 28	Metal	Railtrack	2.21	7
WYM 07	568	Pile Pit 53-55	Section 28	Cut	Early cut	1.44	
WYM 07	569	Pile Pit 53-55	Section 28	Fill	Fill of cut [571]	1.36	
WYM 07	570	Pile Pit 53-55	Section 28	Fill	Primary fill of cut [571]	1.4	
WYM 07	571	Pile Pit 53-55	Section 28	Cut	Construction cut	1.4	
WYM 07	572	Pile Pit 71-73	Section 30	Layer	Demolition layer	2	
WYM 07	573	Pile Pit 71-73	Section 30	Layer	Layer slag / clinker	1.7	
WYM 07	574	Pile Pit 71-73	Section 30	Surface	Metalled industrial floor	1.55	5
WYM 07	575	Pile Pit 71-73	Section 30	Layer	Layer slag / clinker	1.48	
WYM 07	576	Pile Pit 71-73	Section 30	Layer	Naturally deposited alluvial clay	1.28	4
WYM 07	577	Pile Pit 71-73	Section 30	Fill	Backfill to cut [579]	1.69	
WYM 07	578	Pile Pit 71-73	Section 30	Pipe	Ceramic pipe in cut [579]	1.51	7
WYM 07	579	Pile Pit 71-73	Section 30	Cut	Construction cut for pipe [578]	1.69	7
WYM 07	580	Pile Pit 71-73	Section 30	Fill	Fill of cut [581]	1.34	
WYM 07	581	Pile Pit 71-73		Cut	Construction cut	1.34	
WYM 07	582	Pile Pit 71-73	Section 30	Surface	Early industrial surface	1.34	5
WYM 07	583	Pile Pit 71-73		Layer	Mortar layer	1.61	
WYM 07	584	Pile Pit 65-67	Section 31-32	Layer	Demolition layer	2.01	
WYM 07	585	Pile Pit 65-67	Section 31-32	Layer	Demolition layer	2	
WYM 07	586	Pile Pit 65-67	Section 31-32	Fill	Fill of cut [587]	1.6	
WYM 07	587	Pile Pit 65-67	Section 32	Cut	Construction cut	1.6	
WYM 07	588	Pile Pit 65-67	Section 31-32	Surface	Metalled industrial floor	1.54	5
WYM 07	589	Pile Pit 65-67	Section 31-32	Surface	Industrial working surface	1.5	
WYM 07	590	Pile Pit 65-67	Section 31-32	Layer	Bedding layer	1.37	
WYM 07	591	Pile Pit 65-67	Section 31-32	Layer	Gravelly layer	1.33	
WYM 07	592	Pile Pit 65-67	Section 31-32	Surface	Burnt earth floor surface	1.2	5
WYM 07	593	Pile Pit 65-67	Section 31-32	Fill	Fill of [582]	1.1	

WYM 07	594	Pile Pit 65-67	Section 31-32	Timber	NW/SE timber	1.1	5
WYM 07	595	Pile Pit 65-67	Section 31-32	Cut	Construction cut for [595]	1.1	
WYM 07	596	Pile Pit 65-67	Section 32	Layer	Gravel / clay	1.15	
WYM 07	597	Pile Pit 65-67	Section 32	Layer	Gravel / clay	1.15	
WYM 07	598	Pile Pit 65-67	Section 31-32	Layer	Re-deposited sandy gravel	1.15	
WYM 07	599	Pile Pit 65-67	Section 31-32	Layer	Naturally deposited alluvial clay	1.1	4
WYM 07	600	Pile Pit 65-67	Section 31	Fill	Infill to [601]	1.12	
WYM 07	601	Pile Pit 65-67	Section 31	Cut	Posthole	1.12	
WYM 07	602	Pile Pit 65-67	Section 10	Masonry	Brick structure	1.98	6
WYM 07	603	Pile Pit 65-67	Section 33-34	Surface	Metalled industrial floor	1.43	5
WYM 07	604	Pile Pit 77-85	Section 33-34	Layer	Demolition layer	2	
WYM 07	605	Pile Pit 77-85	Section 33	Surface	Late industrial floor	1.7	6
WYM 07	606	Pile Pit 77-85	Section 33	Fill	Fill of [608]	1.63	
WYM 07	607	Pile Pit 77-85	Section 33	Fill	Fill of [608]	1.63	
WYM 07	608	Pile Pit 77-85	Section 33	Cut	Cut	1.63	
WYM 07	609	Pile Pit 77-85	Section 33-34	Fill	Fill of [612]	1.5	
WYM 07	610	Pile Pit 77-85	Section 33-34	Fill	Fill of [612]	1.51	
WYM 07	611	Pile Pit 77-85	Section 33-34	Fill	Fill of [612]	1.1	
WYM 07	612	Pile Pit 77-85	Section 33-34	Cut	Cut	1.75	
WYM 07	613	Pile Pit 77-85	Section 33-34	Layer	Naturally deposited alluvial clay	1.45	4
WYM 07	614	Pile Pit 77-85	Post ex	Masonry	Wall foundation	1.32	5
WYM 07	615	Pile Pit 77-85	Section 34	Layer	Layer of slag & clinker	1.51	
WYM 07	616	Pile Pit 77-85	Section 34	Surface	Metalled industrial floor	1.41	5
WYM 07	617	Pile Pit 77-85		Fill	Fill of [618]	2.08	
WYM 07	618	Pile Pit 77-85		Cut	Large robber cut	2.08	
WYM 07	619	Pile Pit 28-30	Post ex	Timber	Associated with [602]	1.15	6
WYM 07	620	Pile Pit 77-85	Section 34	Fill	Backfilll of [602]	2	
WYM 07	621	Pile Pit 77-85	Section 34	Fill	Infill of [602]	1.6	

WYM 07	622	Pile Pit 77-85	Section 34	Cut	Construction cut for [460]	2	
WYM 07	623	Pile Pit 59-61	Section 35	Layer	Demolition layer	2.07	
WYM 07	624	Pile Pit 59-61	Section 35	Fill	Fill of cut [625]	1.57	
WYM 07	625	Pile Pit 59-61	Section 35	Cut	Late cut	2.07	
WYM 07	626	Pile Pit 59-61	Section 35	Layer	Ferrous working debris	2.07	
WYM 07	627	Pile Pit 59-61	Section 35	Surface	Metalled industrial floor	1.37	5
WYM 07	628	Pile Pit 59-61	Section 35	Layer	Made ground	1.26	
WYM 07	629	Pile Pit 59-61	Section 35	Layer	Re-deposited clay	1.07	
WYM 07	630	Pile Pit 59-61	Section 35	Layer	Woodchip layer	0.88	5
WYM 07	631	Pile Pit 59-61	Section 35	Layer	Compressed timber	1.01	5
WYM 07	632	Pile Pit 59-61	Section 35	Layer	Naturally deposited alluvial clay	0.95	4
WYM 07	633	Pile Pit 59-61	Section 35	Fill	Backfill of [635]	1.72	
WYM 07	634	Pile Pit 59-61	Post ex	Pipe	Ceramic pipe	1.66	7
WYM 07	635	Pile Pit 59-61		Cut	Construction cut for [634]	1.72	
WYM 07	636	Pile Pit 59-61	Post ex	Timber	Part of timber drain	0.93	5
WYM 07	637	Pile Pit 59-61	Post ex	Timber	Part of timber drain	0.91	5
WYM 07	638	Pile Pit 59-61	Post ex	Timber	Timber cap of drain	0.93	5
WYM 07	639	Pile Pit 59-61		Fill	Infill to [636] & [637]	0.9	
WYM 07	640	Pile Pit 59-61		Fill	Backfill to [641]	0.98	
WYM 07	641	Pile Pit 59-61		Cut	Construction cut	0.98	
WYM 07	642	Pile Pit 59-61	Post ex	Structure	Wooden drain	0.98	
WYM 07	643	Pile Pit 44-46	Section 36	Layer	Made ground	2.07	
WYM 07	644	Pile Pit 44-46	Section 36	Layer	Layer of slag & clinker	1.44	
WYM 07	645	Pile Pit 44-46	Section 36	Fill	Backfill [646]	1.49	
WYM 07	646	Pile Pit 44-46	Section 36	Cut	Construction cut for decayed timber	1.49	
WYM 07	647	Pile Pit 44-46	Section 36	Layer	Made ground	1.42	
WYM 07	648	Pile Pit 44-46	Section 36	Layer	Naturally deposited alluvial clay	1.1	4
WYM 07	649	Pile Pit 44-46	Section 36	Masonry	E/W wall foundation	2.05	
WYM 07	650	Pile Pit 44-46	Section 36	Masonry	Brickwork around pipe	1.92	7
WYM 07	651	Pile Pit 44-46	Post ex	Pipe	Ceramic pipe	1.87	7
WYM 07	652	Pile Pit 44-46	Post ex	Masonry	Brickwork around pipe	1.71	7
WYM 07	653	Pile Pit 44-46	post ex	Pipe	N/S ceramic blast pipe	1.71	7
WYM 07	654	Pile Pit 44-46	Section 36	Cut	Construction cut for wall [649]	2.06	
WYM 07	655	Pile Pit 44-46	Post ex	Cut	Construction cut for [650] & [651]	2.06	
WYM 07	656	Pile Pit 44-46	Post ex	Cut	Construction cut for brick flue [652]	2.06	

WYM 07	657	Pile Pit 44-46	Post ex	Fill	Fill of [651]	1.87	
WYM 07	658	Pile Pit 44-46	Post ex	Fill	Infill of [653]	1.51	
WYM 07	659	Pile Pit 44-46	Post ex	Fill	Infill to [660]	1.55	
WYM 07	660	Pile Pit 44-46	Post ex	Pipe	Ceramic pipe	1.58	7
WYM 07	661	Pile Pit 44-46	Post ex	Cut	Construction cut for [660]	1.58	
WYM 07	662	Pile Pit 44-46	Post ex	Fill	Backfill between wall and flue [650]	1.61	7
WYM 07	663	Pile Pit 50-52	Section 38	Timber	N/S Timber	1.26	5
WYM 07	664	Pile Pit 50-52	Section 38	Timber	N/S Timber	1.22	5
WYM 07	665	Pile Pit 50-52	Section 38	Timber	N/S Timber	1.27	5
WYM 07	666	Pile Pit 50-52	Section 37	Masonry	Brick structure	1.27	5
WYM 07	667	Pile Pit 50-52	Section 37	Timber	E/W Timber	1.08	5
WYM 07	668	Pile Pit 50-52	Section 37-38	Layer	Made ground	1.35	
WYM 07	669	Pile Pit 50-52	Section 37	Layer	Clay	1.12	
WYM 07	670	Pile Pit 50-52	Section 37-38	Layer	Made ground	2.03	
WYM 07	671	Pile Pit 50-52	Section 37-38	Layer	Burnt clay	1.6	5
WYM 07	672	Pile Pit 50-52	Section 37	Layer	Bedding layer	1.3	5
WYM 07	673	Pile Pit 50-52	Section 37	Fill	Fill of [674]	1.38	
WYM 07	674	Void					
WYM 07	675	Pile Pit 50-52	Section 37	Layer	Redeposited clay	1.24	
WYM 07	676	Pile Pit 50-52	Section 37	Metal	Rail track	2.2	
WYM 07	677	Pile Pit 50-52		Layer	Bedding layer	1.23	
WYM 07	678	Pile Pit 50-52	Section 37	Cut	Construction cut for [666]	1.3	
WYM 07	679	Pile Pit 4-6	Section 39-40	Masonry	N/S Brick structure	2.05	6
WYM 07	680	Pile Pit 4-6	Section 40-41	Masonry	Remains of brick flue	1.16	6
WYM 07	681	Pile Pit 4-6	Section 41	Metal	Vertical metal plates/stanchion	1.83	7
WYM 07	682	Pile Pit 4-6	Section 41	Timber	Vertical timber pile post	1.86	
WYM 07	683	Pile Pit 4-6	Post ex	Masonry	Brick floor surface	1.1	7
WYM 07	684	Pile Pit 4-6	Post ex	Masonry	N/S wall remains	1.65	
WYM 07	685	Pile Pit 4-6	Section 41	Layer	Made ground	2.08	
WYM 07	686	Pile Pit 4-6	Section 39-40	Layer	Bedding layer	1.45	
WYM 07	687	Pile Pit 4-6	Section 41	Fill	Backfill around stanchion	1.5	

WYM 07	688	Pile Pit 4-6	Section 40	Fill	Later infill to flue [680]	1.09	
WYM 07	689	Pile Pit 4-6	Section 40-41	Cut	Construction cut for E/W flue	1.29	
WYM 07	690	Pile Pit 4-6	Section 40	Layer	Bedding layer	1.2	
WYM 07	691	Pile Pit 16-18	Section 42	Layer	Made ground	2.04	
WYM 07	692	Pile Pit 16-18		Masonry	Brick structure	1.97	6
WYM 07	693	Pile Pit 16-18	Section 42	Layer	Slag / clinker	1.7	
WYM 07	694	Pile Pit 16-18	Section 42	Fill	Fill of cut [695]	1.5	
WYM 07	695	Pile Pit 16-18	Section 42	Cut	Robber cut	1.5	
WYM 07	696	Pile Pit 16-18	Section 42	Surface	Crushed brick floor	1.5	5
WYM 07	697	Pile Pit 16-18	Section 42	Layer	Bedding layer	1.3	5
WYM 07	698	Pile Pit 16-18	Section 42	Layer	Naturally deposited alluvial clay	1.3	4
WYM 07	699	Pile Pit 19-21	Section 45	Fill	Backfill to cut [700]	2.05	
WYM 07	700	Pile Pit 19-21	Section 45	Cut	Construction cut for ceramic pipe	2.05	7
WYM 07	701	Pile Pit 19-21	Section 45	Layer	Demolition layer	2.05	
WYM 07	702	Pile Pit 19-21	Section 45	Layer	Thin band of clay	1.7	
WYM 07	703	Pile Pit 19-21	Section 45	Layer	Thin bed of mortar	1.68	7
WYM 07	704	Pile Pit 19-21	Section 45	Pipe	Large ceramic pipe	1.9	7
WYM 07	705	Pile Pit 19-21	Section 45	Layer	Layer of ash /cinders	1.66	
WYM 07	706	Pile Pit 19-21	Section 45	Surface	Metalled industrial floor	1.5	5
WYM 07	707	Pile Pit 19-21	Section 45	Layer	Naturally deposited alluvial clay	1.3	4
WYM 07	708	Pile Pit 7-9	Section 43	Layer	Made ground	2.1	
WYM 07	709	Pile Pit 7-9	Section 43	Layer	Re-deposited clay	1.94	
WYM 07	710	Pile Pit 7-9	Section 43	Layer	Made ground	1.72	
WYM 07	711	Pile Pit 7-9	Section 43	Metal	Ferrous metal plate	1.37	5
WYM 07	712	Pile Pit 7-9	Section 43	Timber	Timber plank	1.38	5
WYM 07	713	Pile Pit 7-9	Section 43	Layer	Clay lining	1.77	5
WYM 07	714	Pile Pit 7-9	Section 43	Layer	Naturally deposited alluval clay	1.16	4
WYM 07	715	Pile Pit 7-9		Cut	Cut for clay lining [713]	1.77	5
WYM 07	716	Pile Pit 13-15	Section 44	Layer	Made ground	2.06	
WYM 07	717	Pile Pit 13-15	Section 44	Layer	Crushed brick floor	1.62	5
WYM 07	718	Pile Pit 13-15	Section 44	Layer	Slag / clinker	1.52	
WYM 07	719	Pile Pit 13-15	Section 44	Layer	Earth floor	1.4	5
WYM 07	720	Pile Pit 13-15	Section 44	Timber	Timber plank	1.37	5
WYM 07	721	Pile Pit 13-15	Section 44	Timber	Timber plank	1.38	5

WYM 07	722	Pile Pit 13-15	Section 44	Timber	Timber plank	1.33	5
WYM 07	723	Pile Pit 13-15	Section 44	Layer	Naturally deposited alluvial clay	1.32	4
WYM 07	724	Pile Pit 1-3	Section 46	Layer	Made ground	2.01	
WYM 07	725	Pile Pit 1-3	Section 46	Surface	Metalled industrial floor	1.49	5
WYM 07	726	Pile Pit 1-3	Section 46	Fill	Fill of [727]	1.38	
WYM 07	727	Pile Pit 1-3	Section 46	Cut	Cut	1.38	
WYM 07	728	Pile Pit 1-3	Section 46	Layer	Slag / clinker	1.39	
WYM 07	729	Pile Pit 1-3	Section 46	Layer	Naturally deposited alluvial clay	1.28	4
WYM 07	730	Pile Pit 7-9		Masonry	Brick culvert		5
WYM 07	731	South East Ramp	Section 47-48	Masonry	E/W brick culvert	1.47	6
WYM 07	732	South East Ramp	Section 47	Layer	Dump deposit	1.9	
WYM 07	733	South East Ramp	Section 47	Concrete	Foundation	1.83	
WYM 07	734	South East Ramp	Section 47	Concrete	Foundation	1.89	
WYM 07	735	South East Ramp	Section 47	Concrete	Possible floor	1.58	
WYM 07	736	South East Ramp	Section 47	Layer	Dumped deposit	1.48	
WYM 07	737	South East Ramp	Section 47	Layer	Bedding layer	1.94	
WYM 07	738	South East Ramp	Section 47	Concrete	Foundation	1.76	
WYM 07	739	South East Ramp	Section 47	Layer	Dumped deposit	1.56	
WYM 07	740	South East Ramp	Section 47	Layer	Redeposited clay	1.48	
WYM 07	741	South East Ramp	Section 47	Layer	Mortar layer	1.34	
WYM 07	742	South East Ramp	Section 47	Masonry	Manhole	2.16	
WYM 07	743	South East Ramp	Section 47	Pipe	Pipe runs into [742]	1.96	
WYM 07	744	South East Ramp	Section 47	Concrete	Foundation	2.16	
WYM 07	745	South East Ramp	Section 47	Concrete	Foundation	2.16	
WYM 07	746	South East Ramp	Section 47	Layer	Made ground	2.08	
WYM 07	747	South East Ramp	Section 47	Concrete	Concrete skim	1.82	
WYM 07	748	South East Ramp	Section 47	Masonry	E/W wall	2.16	
WYM 07	749	South East Ramp	Section 47	Concrete	Rubble footing	1.36	
WYM 07	750	South East Ramp	Section 47	Layer	Naturally deposited alluvial clay	1.26	4
WYM 07	751	South East Ramp	Section 49	Layer	Made ground	1.98	
WYM 07	752	South East Ramp	Section 49	Layer	Made ground	1.66	
WYM 07	753	South East Ramp	Section 49	Layer	Made ground	1.6	
WYM 07	754	South East Ramp	Section 49	Layer	Demolition layer	1.52	
WYM 07	755	South East Ramp	Section 49	Fill	Backfill to [756]	1.66	

WYM 07	756	South East Ramp	Section 49	Cut	Cut	1.66	
WYM 07	757	South East Ramp		Pipe	E/W ceramic pipe	1.46	7
WYM 07	758	South East Ramp	Section 48	Layer	Made ground	1.96	
WYM 07	759	South East Ramp	Section 48	Fill	Backfill to [761]	1.89	
WYM 07	760	South East Ramp	Section 48	Pipe	N/S pipe	1.96	7
WYM 07	761	South East Ramp	Section 48	Cut	Cut for pipe [760]	1.96	7
WYM 07	762	South East Ramp	Section 48	Layer	Made ground	1.61	
WYM 07	763	South East Ramp	Section 48	Layer	Demolition layer	1.58	
WYM 07	764	South East Ramp		Masonry	Brick wall / floor	1.71	5
WYM 07	765	South East Ramp	Section 48	Layer	Mortar layer	1.61	
WYM 07	766	South East Ramp	Section 48	Surface	Metalled industrial floor	1.56	5
WYM 07	767	South East Ramp	Section 48	Layer	Levelling layer	1.49	
WYM 07	768	South East Ramp	Section 48	Fill	Fill of [769]	1.94	
WYM 07	769	South East Ramp	Section 48	Cut	Cut	1.94	
WYM 07	770	South East Ramp	Section 48	Layer	Slag / clinker	1.96	
WYM 07	771	South East Ramp	Section 48	Layer	Slag / clinker	1.76	
WYM 07	772	South East Ramp	Section 48	Layer	Dumped deposit	1.61	
WYM 07	773	South East Ramp	Section 47	Masonry	N/S wall	2.08	
WYM 07	774	South East Ramp	Section 47	Masonry	Wall footing	1.89	7
WYM 07	775	South East Ramp	Section 47	Surface	Rubble brick floor	1.61	
WYM 07	776	North West Ramp	Post ex	Masonry	Brick structure	2	7
WYM 07	777	North West Ramp	Section 50	Pipe	N/S ceramic pipe	1.62	7
WYM 07	778	North West Ramp	Post ex	Pipe	E/W ceramic pipe	1.58	7
WYM 07	779	North West Ramp	Post ex	Concrete	Circular concrete & wood turntable base	1.85	5
WYM 07	780	North West Ramp	Post ex	Pipe	N/S pipe same as [778]	1.71	7
WYM 07	781	North West Ramp	Section 50	Masonry	N/S brick culvert	1.24	6
WYM 07	782	North West Ramp	Section 50	Masonry	E/W brick flue	1.11	6
WYM 07	783	North West Ramp	Section 50	Masonry	Square brick structure	1.72	6
WYM 07	784	North West Ramp	Section 50	Cut	Cut for [783]	1.9	
WYM 07	785	North West Ramp	Section 50	Rail	Tram rails	2.2	7
WYM 07	786	North West Ramp	Section 50	Fill	Fill of cut [783]	1.9	
WYM 07	787	North West Ramp	Section 50	Fill	Fill of cut [784]	1.9	
WYM 07	788	North West Ramp	Section 50	Layer	Made ground	1.9	
WYM 07	789	North West Ramp	Section 50	Layer	Redeposited clay	1.4	
WYM 07	790	North West Ramp	Section 50	Layer	Made ground	2	

WYM 07	791	North West Ramp	Section 50	Layer	Sand	1.78	
WYM 07	792	North West Ramp	Section 50	Layer	Demolition layer	1.9	
WYM 07	793	North West Ramp	Section 50	Layer	Layer of ash and cinders	1.31	
WYM 07	794	North West Ramp	Section 50	Layer	Naturally deposited alluvium	1.5	4
WYM 07	795	North West Ramp	Section 50	Concrete	Concrete base for rails	2.2	7
WYM 07	796	North West Ramp	Section 50	Surface	Metalled industrial floor	1.44	5
WYM 07	797	North West Ramp	Section 50	Layer	Layer of ash, cinders & charcoal	1.38	5
WYM 07	798	North West Ramp	Section 50	Layer	Naturally deposited alluvium	1.33	4
WYM 07	799	North West Ramp	Section 50	Fill	Backfill of [776]	1.96	
WYM 07	800	Pile Pit 10-12	Section 51	Pipe	Large NE/SW ceramic pipe	1.8	7
WYM 07	801	Pile Pit 10-12	Section 51	Masonry	Brick manhole	1.9	
WYM 07	802	Pile Pit 10-12	Section 51	Cut	Cut for [801]	1.6	
WYM 07	803	Pile Pit 10-12	Section 51	Layer	Demolition layer	2	
WYM 07	804	Pile Pit 10-12	Section 51	Surface	Metalled industrial floor	1.6	5
WYM 07	805	Pile Pit 10-12	Section 51	Layer	Ash, charcoal	1.45	
WYM 07	806	Pile Pit 10-12	Section 51	Layer	Bedding layer	1.4	
WYM 07	807	Pile Pit 10-12	Section 51	Layer	Woodworking debris	1.15	5
WYM 07	808	Pile Pit 10-12	Section 51	Cut	Beam slot	1.1	5
WYM 07	809	Pile Pit 10-12	Section 51	Layer	Naturally deposited alluvium	1.1	4
WYM 07	810	Structure A		Structure	Building Number		5
WYM 07	811	Structure B		Structure	Building Number		6
WYM 07	812	Structure C		Structure	Building Number		6
WYM 07	813	Structure D		Structure	Building Number		5
WYM 07	814	Group No		Concrete	Pile foundations		8
WYM 07	815	Group No		Concrete	Concrete features		8
WYM 07	816	Group No		Concrete	Concrete features		8

APPENDIX 2: BUILDING MATERIAL ASSESSMENT (KEVIN HAYWARD, PCA)

Introduction & Aims

A sizeable building material assemblage (371 examples) consisting almost entirely of whole brick samples (292 examples) and mortar (30 samples) together with some worked and artificial stone and tile (49 examples) were retained from excavation from the late post-medieval to early post-modern site of Westferry Road, Isle of Dogs (WYM 07) TQ 3764 7853. Material from Phase 1 of the excavations [0-423] (external to the Forge) was examined at Pre-Construct Archaeology during January/February 2008 whilst material from Phase 2 [464-783] (inside the Forge) was examined during October 2008. Referral was also made to on-site context documents in order to provide a fuller picture of brick use at this site.

This assessment serves a number of purposes.

- The identification (under binocular microscope) of the fabrics and forms of the brick assemblage retained from Westferry Road. Focus will be on material obtained from structures A-D, the northern and south-eastern workshops [810] and [813], the slightly later Grade 2 listed building – The Forge [811] and its adjoining building [812].
- The identification of the mortar fabric from these workshops.
- The identification of the geological character and (where possible) the geological source of the stone used as machine bases and millstones from this site.
- To ascertain whether Coade stone (artificial stone) was used as a substitute to natural stone materials in these structures
- In each section - identify any interesting or unusual pieces that warrant retention.
- The phase summary will identify whether brick fabric, form and mortar type can relate to different construction Phases (5-7) in these workshops. (a) One factor to consider is whether hand (or stock-moulded) bricks are used solely in the walling of the earliest Phase 5 workshops. As these bricks pre-date 1850, this information would be critical in identifying the early 19th century Brunel workshops and corroborate the documentary evidence from the J S Russell period. (b) Another is to relate brick fabric and form to the later 19th century development of this site (especially the construction and continued use of the Forge during construction Phases 6-7) – The C J Mare and J Westwood & Son Periods. The presence of machined bricks and later mortar types may help answer these questions.
- The compilation of a stone catalogue (Westferry.cat), which accompanies this assessment.
- Rationalisation of the brick assemblage at Westferry Road and recommendation for further analysis.

Methodology

The building materials were examined using the London system of classification with a fabric number allocated to each object. The application of a 1kg mason's hammer and sharp chisel to each example ensured that a fresh fabric surface was exposed. The fabric was examined at x20 magnification using a long arm stereomicroscope or hand lens (Gowland x10). Where possible, comparison was then made with the Pre-Construct Archaeology Building Material reference collection in order to provide a

match. After analysis the common fabric types were discarded. Any unusual or interesting fabrics were retained.

Brick Form and Fabric

Introduction

Starting with construction bricks followed in turn by kiln and then engineering bricks, an overview of the whole brick assemblage at Westferry Road by fabric and form (including makers' marks) serves to quantify and describe the common types and highlight the presence of any unusual or interesting fabrics and forms that may provide valuable dating evidence in the phase summary.

Post-Medieval Construction Bricks – Fabrics

3032; 3032nr 3035; 3033; 3034; 3034nr3035; 3035; 3039; 3042; 3047

A representative selection of construction bricks were retained (234 examples) and examined from the walls and internal structures throughout the site. As expected all the common late post-medieval-early modern fabric groups *3032; 3033; 3034; 3035* and intermediary forms are represented with fabric *3032* being by far, 117 examples, the most common. There are *possibly* some reused Tudor/medieval bricks *3039* and *3042.*

Fabrics *3032* and *3034* (Date Range 1666-1900)

These common red/purple bricks (which weather yellow) with clinker inclusions and voids are present in a range of forms at Westferry Road:

(a) Unfrogged (hand-made) stock moulded (new or reused) (1666-1850) common in the E-W Wall [9]; [13] and N-S Wall [11] of the northern workshop and the crane base [2] just outside of it. Also identified in the E-W Wall of the south-east workshop e.g. [104] and the floor surfaces [185] [205] and culverts [337]. These bricks are far less common inside the later Phases 6 and 7 Forge (Structure 811) and where they occur are often custom-made as slightly curved (dog-leg profiles) [531] or reused.

(b) Shallow-frogged, stock moulded bricks (new or reused) (1750-1850) usually 65-67mm thick also common in E-W [9] [83] and N-S Wall of the northern workshop e.g. [6]. Internal Structures of the south-east workshop e.g. [91] especially with feature 263 [183] but also reused throughout the site. Some have makers' marks e.g. JIK [183].

(c) Machine extruded (1850+) deep frogged bricks common in the south-east workshop especially in walls surrounding feature 212 ([208]-[209]; [213]; [232]) and feature 265 ([306]-[307]). These bricks are also common in the later 19th century construction of the Forge e.g. [684].

Fabrics *3035; 3032nr3035; 3034nr3035* (Date Range 1780-1940)

The very common yellow early post-modern London Brick Fabric *3035* and its intermediate forms *3032nr3035 (specks of yellow)* and *3034nr3035 (swirly yellow inclusions)* are also common at Westferry Road (68 examples). There is variability in the manufacture and form of these bricks. This information is important in understanding the development of the workshops.

(1) Stock Moulded bricks (1780-1850) (frogged and unfrogged) are typically thick 62-64mm. Frogged examples have a shallow (12mm thick), wide (60mm) profile. Some have a maker's mark *3X; J* [140] *3IX* [148].

These brick types are mainly found in the early rubble foundation [140], line the early flue (feature 263) [146]; [148]; [176]; [197] and machinery base (feature 213) [91]; [146]; [213] of the south-east workshop. These forms were also very common in the early E-W/N-S walling of the northern workshop e.g. [1]; [6]; [11]; [13]; [83]; [419]; [420] that may relate to the foundry foundation for the Great Eastern and an early flue abutting the early walling [408]. This form only occurs reused in the Phase 6 and 7 Forge e.g. [539] [692].

(2) Machined Bricks (1850+) deep frogged, these are present with other machined bricks e.g. modular orange fabric *3033*; machined *3032* throughout the site but common capping a later concrete foundation close to feature 263 [268; 274] and flooring associated with construction feature 427 [338]; [341-2]; [344]; [370]; [373] and possible repairs to feature 213 [91] – from the south-east workshop [813]. In the northern workshop [810] it is present in some earlier walling [13]; [91]. This form is also very common in the flue lining, capping [652] flooring [683] and walling [684] of the Forge.

Fabrics *3033* and *3047* (Date Range 1850+)

A small quantity of red thin machined bricks fabric *3047* is found in the square base of [88] the conjoining workshop/forge. All of the other bricks are machined (post 1850+) probably late 19th- early 20th century having either a very deep-frog with makers mark LBC Porphyries as with a man-hole cover in [94] or a modular brick as capping a later concrete foundation close to feature 263 [268]; [274] of the south-east workshop.

Possible Medieval *3042*

A solitary example of a possible reused medieval fabric *3042* [361] has been found in a dump layer immediately above Phase 4 alluvium may have been redeposited from another part of the surrounding vicinity.

Kiln Bricks (1850+)

Fifty-one examples of heavy white machined (1850+) kiln bricks (manufactured out of fire-clay from the Upper Carboniferous Coal Measures) are present in the flues from workshop structures 810, 811 and 813 from Phase 5 onwards. Most are the common rectangular (or standard) form [97], but examples of the keystone form (used in the central part of a kiln) [83], curved or voussoir type [97], flatter "bat" brick [177], narrow "soap" form [301]. Unusual forms that may warrant further analysis include an example with punch marks [410] Makers' marks include *John Stevens Stourbridge* [7] *HING F.C.S.* [13] (this may be stock moulded? and therefore pre 1850) *Clip Newcastle* [97] [197], clearly representing kiln brick supply from different parts of the country. A pinker fabric [147] is comparable with kiln bricks from the Glasgow area, but other fireclays from different parts of the British Isles may also have this property.

The kiln bricks concentrate around flues from the Phase 5 feature 263 [147; 175; 177; 197] of the south-east workshop [813], the Phase 5 furnace [410; 418] and Phase 7 flues [7] of the northern

workshop and the Phase 6 [679] [680] and Phase 7 [477] flues of the Forge area [811]. Re-use also occurs in the walling of the northern workshop e.g. [13]; [83].

Kiln Furniture
An example of Kiln Furniture (probably reused) from a brick base of the south-east workshop [159] of unknown form also attests to the presence of kilns.

Mortar Type *3101M*
33 examples
1.1kg

The following comments are based on the small representative sample of mortar retained from this site.
Examples of the hard brown Roman Cement, patented after 1796 are present only on older stock moulded bricks *3032; 3032nr 3035*; *3034* (frogged and unfrogged) that pre-date 1850 [83] [197] [208] [210] [271] [296] [299]. As most of these bricks were not reused it is reasonable to assume that this mortar was adhered to the original fresh stock moulded bricks.

Harder, dark grey, Portland Cement, patented after 1830, on the other hand was mainly adhered to machined bricks [153] [155] [176] [209] [250] [272] [422] [464] [730]. This makes sense, given that machined bricks are only produced after 1850. One exception was a stock moulded brick from [140] which is perfectly acceptable. Where original stock moulded brick walls have been repaired using machined bricks as with the main wall of the northern workshop [83], the former have Roman Cement whilst the latter contain Portland Cement.

Examples of clinker, gravel and tile concrete which date from after 1860 are common in the machine base concrete of the south-east workshop [225] [226]. Aggregate concrete (1880+) coats the large drain [245] that runs the entire north-south boundary of the Phase 6 Forge. Clinker concrete is also found associated with a later concrete foundation [268] near to feature 263. These types of concrete are associated with the latest bricks on site including *3035* [464] modern deep frogged *3033* and modular *3033*.

In summary, the array of mortar types provides additional evidence for the site's mid 19th foundation and development into the 20th century. The presence of Roman mortar with pre-1850 stock moulded bricks seem to be associated (though are not exclusive to) the site's earliest Phase 5 (J S Russell workshop) development. Portland Cement occurs with machined bricks that are associated with additions to the flooring and machine bases from the south-east workshop – but also rebuilding the earliest construction walls of the northern workshop [83] and the construction of the Forge [683] [684]. The use of later 19th century (brick) concrete is also associated with the Forge [692] and the later development of machine bases from the south-east workshop.

Tile
2276; 2279
A single example of the common peg tile fabric 2276 (1200-1800) [361] and two reused pan tiles 2279 (1630-1850) [88] [175] provide little chronological information for the site.

Drain – Blast Pipes

The six Victorian (1850+) octagonal shaped blast pipe fragments made of a kiln brick fabric corroborate with the other 19th century building material evidence from this site but particularly occur in the Phase 7 Forge [507] [548] [651] [656]. They have a double internal skin created by mortaring a smaller pipe within a larger one.

Coade stone *3128*
A solitary example of this fine-white artificial stone [92] (manufactured in London (Lambeth) between 1770 and 1840) (not sandstone as recorded) was used as an alternative to natural stone materials as a recess to the grind wheel [feature 213] in the south-east workshop. I am not aware of Coade stone being used in any other industrial structures, however, this example appears to be from a moulding (recess?) and these materials can easily be shaped. This early date may be of significance to the initial development of this date (see Phase Summary).

Stone
3110; 3115; 3120; 3124; 3130
York Stone Upper Carboniferous, Yorkshire *3120* [61] [107] [586] observed [170] [214] 10.1kg
Millstone Grit, Upper Carboniferous, South Yorkshire/Bristol *3130* [+] [109] [312] [486] 49.7kg
North Wales Slate, Palaeozoic – North Wales *3115* [363] *Nail Hole* 135g
Weldon Stone – Bajocian (Middle Jurassic) Northamptonshire [304] *3124* (the similar Ketton stone (Bajocian) Rutland comes from the same stratigraphic position as Weldon Stone) 73g
Possible Granite Grindstone (recorded but not retained workshop 1) [101] *3135*
Possible Chalk [153] [169] chalk wall/ machine base (recorded only) *3116*
Kentish Ragstone [205] floor surface (recorded only) *3105*
Portland Whit Bed – Portlandian (Upper Jurassic) [464] *3110* 2.7kg
Seven possibly eight rock types were worked for use in the northern and south-eastern workshops and forge. Machine blocks used the very hard and compact fine-grained quartz/feldspar/mica sandstone – York stone [61] [107] and possibly [170] and [214]. The hard coarse-grained, angular, quartz rich sandstone – millstone grit was identified in two fragments in a large millstone [312] but also possibly as a machine base [109]. An unstratified example had a large iron fixing attached, presumably having some industrial function. One example of a North Wales Slate [363] had a nail hole indicating what some of the roofing of these workshops was made from. These three materials are from industrial northern and western Britain. The two sandstones are associated with the Upper Carboniferous Coal Measures and would have been readily available to quarry and supply for large construction projects in London during the mid 19th century (along with the kiln bricks), especially with the advent of the railways. In conclusion these three materials fit with a mid Victorian date of these workshops which built the Great Eastern.

A fragment of Weldon Stone has also been recorded from [304]. This is not a material you would expect to be associated with industrial activity as it is so soft. Furthermore, in London, it has only been identified in Roman contexts in sarcophagi (Hayward forthcoming) and sculpture Riverside Wall (Dimes 1980; Hayward forthcoming). A paving slab of Portland Whit Bed from inside the Forge [464] however, is a very common 19th century freestone material. Little can be added about the possible granite millstone, Kentish Rag flooring and chalk [153] recorded other than the chalk is a surprisingly soft material choice for a machine base [152]; [169]. These could have been mistaken for another piece of Coade stone (see above).

Phase Summary

Finally, how does the form and the fabric of the loose and standing building material assemblage, (brick; mortar and stone) at Westferry Road relate to the different construction phases (based on the archaeological and documentary evidence)

Phases 1-4: Natural (Gravel; Peat; Alluvium)
No building material present.

Phase 5: J S Russell Ironworks (1848-1859)

Walls

The early N-S and E-W perimeter walls defining both the northern [6]; [9; [11]; [13]; [83]; [419] and south-east workshops [104], are, in the main (machined bricks are used in rebuilds of these walls, which seems inevitable given the longevity of these workshops), dominated by frogged and unfrogged stock moulded bricks, which pre-date the introduction of machined bricks to before 1850. What is more, the London fabric *3035,* typical of many of these bricks means that the walls can be dated more accurately between 1770 and 1850. Roman Cement, patented after 1796 is adhered to most of these bricks, which refines the timeline yet further to between 1800 and 1850 (despite an odd example of Portland Cement (1830+) [140]). Furthermore, as the frogs in many of these examples are well made shallow depressions it would seem more probable that the bricks were manufactured at a later (early to mid 19th century date). To summarise, the dating evidence from the brickwork corroborates with the documentary evidence in showing that the construction of the two workshops occurred during the middle part of the nineteenth century. These structures would have been used in the construction and fitting out of the Great Eastern between 1854 and 1859.

Internal Structures

Phase 5 structures inside both these workshops such as the external lining of the early flue [object 263] contexts [146] [148] [176] [197] of the south-east workshop and the Quench Tank [401] of the northern workshop are again dominated by a similar suite of frogged and unfrogged stock moulded bricks as that used to construct the walling. The flue itself uses quantities of kiln brick in its construction which along with the kiln brick and construction brick used in the furnace of the northern workshop [410] and [418] are mainly machined (post 1850). The use of machined brick with stock-

moulded in the Phase 5 (1848-1859) northern and south-east workshops can be explained by the emerging technology in manufacturing machined bricks (machine press or extrusion) after 1850 and the continued reliance of stock (hand-made) manufacture.

Both stone (York Stone; Millstone Grit) and artificial stone (Coade Stone) materials are used as machine bases and grind-wheel components in the manufacture of iron from this early phase. The hard fine laminated York stone is present as internal machine base in the south-east workshop [107] (Observed in machine base [214] workshop).

Coarser, Millstone Grit is also used as a machine base in the south-east workshop [109] close to [107] but it is not clear whether this is from a later phase or not. Its use in a large millstone [312] also in the south-east workshop may also be from this phase.

The coade stone [92] appears also to have been used in this phase in the recess of a grind wheel (feature 213) elsewhere in the south-east workshop. As it was only manufactured between 1770-1840 this would place it close to the J S Russell Period (1848-1859).

Features external to the workshops from this phase such as a flue [465] man-hole cover [730] and brick wall [764] use a mixture of machined and reused stock moulded brick in their construction – a feature already identified in the internal features from this period.

Phase 6: C J Mare Iron Works (1860-1871)

This phase, characterised by alterations to the existing northern and south-east workshops and construction of the forge [811] and adjoining building [812] is represented by a mixture of machined (and frogged) construction and kiln bricks and some reused stock bricks. The mortar either contains clinker or gravel inclusions or hard Portland Cement, each widely used during the mid-late 19th century.

Conjoining Building 812 and Foundry 811

The re-use of yellow and red stock moulded brick using clinker cement in the walling of the conjoining building [337] dates it to after 1860 as clinker cement is used only from this period. This fits with the period of its construction (1860-1871). The Forge itself also has reused stock moulded bricks in the blacksmiths hearth [692] but uses custom-made (hand made) dog-leg stock bricks on the external lining of the flue [679] [680]

Internal Alterations to the South-East Workshop

Unlike the Phase 5 flue [object 263] the Phase 6 flue [object 268] contains far more machined extruded brick [274] and clearly represents a later developmental phase in its construction. The use of machined bricks is also evident in the footings of a substantial wall foundation [272] and a brick culvert [105].

Phase 7: J Westwood & Son (1884-1940)

Alterations in the structure and function for buildings 810-813 during this phase are represented by machine-made unfrogged red and deep frogged modern bricks typical of the late 19th to early 20th century.

The northern boiler workshop [810] had a linear channel lined with kiln bricks [7] two with the makers stamp John Stevens Stourbridge, a well-known fire-clay manufacturer from the West Midlands during the 1930s. The outlying Accumulator [2] which was built during this phase has reused stock moulded bricks.

Additions to the south-east planning workshop [813] including the large rectangular lined brick pit [structure 213] a possible machine press, contains a large quantity of deep frogged modern bricks bonded with Roman cement [208] [209] [232] [233]. This combination is typical of a 20th century alteration.

Alterations to the Forge include a kiln brick flue [477] made of machined kiln brick typical of the late 19th to early 20th century and a succession of blast-pipes made out of kiln brick material.

Distribution

Context	Form	Size	Date range of material		Latest dated material	
1	Stock-Moulded Frogged Brick	2	1770	1850	1770	1850
2	Stock-Moulded Unfrogged Brick	2	1666	1850	1666	1850
5	Stock-Moulded Frogged Brick	2	1750	1850	1750	1850
6	Stock-Moulded Frogged Brick	2	1750	1850	1770	1850
7	Kiln Stamped John Stevens Stourbridge	2	1850	1950	1850	1950
9	Stock Moulded Bricks	2	1666	1850	1750	1850
11	Stock Moulded Unfrogged Bricks	2	1666	1850	1770	1850
13	Kiln, Stock and Machine Bricks	5	1666	1950	1850	1950
61	Stone Paving York Stone	8	1700	1950	1700	1950
83	Stone, Brick, Tile, Mortar	11	1666	1940	1830	1940
88	Paving Brick, Brick, Mortar	8	1666	1940	1865	1940
91	Brick Frogged Machined and Stock	2	1750	1940	1850	1940
92	Coade Stone	3	1770	1840	1770	1840
94	Machine Modern Brick	2	1850	1950	1850	1950
97	Kiln Bricks Machined	3	1850	1950	1850	1950
103	Machined Brick	2	1850	1900	1850	1900
104	Machined and Stock Moulded Brick	2	1666	1900	1850	1900
105	Stock Moulded and Machined Kiln	2	1780	1940	1850	1940
106	Stock Moulded Frog and Unfrog	2	1666	1850	1750	1850
107	Stone Paving York Stone	7	1700	1950	1700	1950
109	Millstone Grit Fragment	16	50	1900	50	1900
125	Machined and Kiln Brick	2	1850	1950	1850	1950
126	Kiln Brick and Stock Mould Brick Reused	2	1770	1950	1850	1950
133	Stock Moulded Frogged Brick	1	1750	1850	1750	1850
140	Stock Moulded Frog Brick	3	1770	1850	1770	1850
141	Machined Brick	2	1850	1940	1850	1940
142	Brick cemented mortar and modern	2	1880	1950	1880	1950

Context	Form	Size	Date range of material		Latest dated material	
	brick					
146	Stock Moulded Frogged and unfrogged	2	1770	1850	1770	1850
147	Kiln Brick	2	1850	1950	1850	1950
148	Stock Moulded Frogged Brick	1	1770	1850	1780	1850
153	Machined Brick and mortar	4	1830	1900	1850	1900
155	Machined brick and mortar	4	1830	1930	1880	1830
157	Machined Brick Stock Moulded and Frogged	4	1770	1900	1850	1900
159	Kiln Brick and Kiln Furniture	2	1850	1950	1850	1950
172	Machined Modern Brick	2	1850	1950	1850	1950
175	Kiln Brick, Pan Tile, Drain	4	1630	1950	1850	1950
176	Stock Brick and Mortar	3	1770	1900	1830	1900
177	Machined and Kiln Brick	2	1850	1950	1850	1950
183	Stock Moulded Frogged Bricks	2	1750	1850	1750	1850
185	Kiln, Stock and Machined Brick	3	1666	1950	1850	1950
186	Kiln, Stock and Machined Brick	4	1750	1950	1850	1950
189	Stock Moulded and Kiln Brick	2	1750	1950	1850	1950
197	Kiln, Mortar, Stock Brick	7	1750	1950	1850	1950
199	Stock Brick	2	1750	1850	1750	1850
200	Machined Brick	2	1850	1940	1850	1940
205	Stock Brick and Cement	3	1666	1930	1880	1930
208	Stock, Machine and Cement	6	1666	1950	1850	1950
209	Machined Brick and mortar	4	1850	1930	1880	1930
210	Stock Brick and mortar	3	1666	1850	1750	1850
213	Stock and Machined Brick	4	1780	1950	1850	1950
217	Stock Moulded Brick	2	1750	1850	1750	1850
225	Mortar	3	1880	1930	1880	1930
226	Mortar	1	1860	1930	1860	1930
232	Machined Brick	2	1850	1940	1850	1940
233	Stock Moulded Brick	2	1666	1850	1750	1850
245	Concrete	1	1890	1940	1890	1940
248	Modern Machined Brick	2	1850	1950	1850	1950
249	Stock Moulded Brick	2	1750	1850	1750	1850
250	Cement	1	1830	1940	1830	1940
265	Stock Moulded Brick	2	1750	1850	1750	1850
268	Machine Moulded Brick and Mortar	5	1850	1950	1850	1950
271	Stock Moulded Brick and Mortar	2	1750	1850	1790	1850
272	Drain, Machine Brick and Mortar	5	1830	1900	1850	1900
274	Machine Moulded Brick and Mortar	5	1850	1940	1880	1940
296	Roman Cement	3	1796	1900	1796	1900
299	Stock Moulded Brick and Mortar	2	1750	1850	1790	1850
301	Kiln Brick	1	1850	1950	1850	1950
304	Weldon Stone Fragments	4	AD200	1900	AD200	1900
305	Stock Moulded Bricks	2	1666	1850	1750	1850
306	Stock Moulded Bricks	2	1750	1850	1750	1850
307	Stock Moulded Bricks	2	1750	1850	1770	1850
311	Stock Moulded Bricks	2	1750	1850	1750	1850
337	Stock Moulded Bricks	2	1666	1850	1666	1850

Context	Form	Size	Date range of material		Latest dated material	
338	Machined Bricks	2	1850	1900	1850	1900
339	Stock Moulded Bricks	2	1750	1850	1750	1850
340	Stock Moulded Bricks	2	1666	1850	1750	1850
341	Stock and Machined Bricks	5	1666	1950	1850	1950
342	Machined Bricks	2	1850	1940	1850	1940
343	Stock Moulded Bricks	2	1750	1850	1750	1850
344	Stock and Machined Bricks	3	1666	1940	1850	1940
361	Kiln, Stock Brick and Peg Tile	4	1480	1950	1850	1950
363	Engineering Bricks and North Wales Slate	3	1850	1950	1850	1950
369	Machined and Stock Moulded Brick	2	1750	1900	1859	1900
370	Stock and Machined Brick	4	1666	1940	1850	1940
371	Stock Moulded and Machined	2	1770	1940	1850	1940
373	Stock Moulded	2	1666	1850	1666	1850
386	Stock Moulded	1	1666	1850	1666	1850
388	Stock Moulded Bricks	2	1666	1850	1770	1850
389	Stock Moulded Bricks	2	1666	1850	1750	1850
401	Stock Moulded Bricks	2	1750	1850	1750	1850
403	Stock Moulded Brick	1	1666	1850	1666	1850
407	Stock Moulded Brick	2	1666	1850	1750	1850
408	Stock Moulded Brick	1	1770	1850	1770	1850
410	Kiln Brick and Machined Brick	3	1850	1950	1850	1950
414	Kiln Bricks	2	1850	1950	1850	1950
415	Kiln and Machined Brick	2	1850	1950	1850	1950
416	Stock Moulded Bricks	3	1750	1850	1770	1850
418	Kiln and Machined Brick	2	1850	1950	1850	1950
419	Stock Moulded Brick	2	1750	1850	1770	1850
420	Reused Stock and Machined Brick	2	1770	1900	1850	1900
421	Machined and Kiln Bricks	2	1850	1950	1850	1950
422	Cement and Kiln Brick	2	1830	1950	1850	1950
423	Machined Brick and Engineering	2	1850	1950	1880	1950
464	Kiln and Machined Brick	3	1850	1950	1850	1950
465	Machined Brick	2	1870	1900	1870	1900
469	Reused stock brick	1	1870	1950	1870	1950
470	Kiln Brick	2	1850	1950	1850	1950
473	Reused stock and machined brick	2	1666	1940	1850	1940
476	Machined Brick	1	1850	1900	1850	1900
477	Kiln Brick	1	1850	1950	1850	1950
481	Kiln and Machined Brick	2	1850	1950	1850	1950
486	Millstone machined Fragment	1	1850	1900	1850	1900
487	Reused stock brick	2	1666	1900	1666	1900
507	Blast-pipe	1	1850	1950	1850	1950
531	Reused stock and Fresh Machined Brick	2	1750	1900	1870	1900
534	Kiln and Machined Brick	2	1850	1950	1870	195053
539	Reused stock moulded brick	2	1666	1900	1870	1900
548	Blast-Pipe	1	1850	1950	1850	1950
586	York Stone Machine Base	1	1700	1900	1700	1900
605	Kiln Bricks	2	1850	1950	1850	1950

Context	Form	Size	Date range of material		Latest dated material	
614	Machine Bricks	2	1850	1900	1850	1900
617	Kiln Bricks	3	1850	1950	1850	1950
649	Reused stock bricks	2	1666	1850	1770	1850
650	Kiln and stock bricks	3	1750	1950	1850	1950
651	Blast-Pipe	1	1850	1950	1850	1950
652	Machined Brick	2	1850	1900	1870	1900
656	Blast-Pipe and Reused stock	2	1666	1950	1850	1950
662	Kiln and Machined Brick	3	1850	1950	1850	1950
666	Kiln and Machined Brick	3	1850	1950	1850	1950
679	Reused stock Brick	2	1750	1850	1770	1850
680	Reused Stock brick	3	1750	1850	1750	1850
683	Machined Brick	1	1850	1900	1850	1900
684	Machined Brick	4	1850	1900	1850	1900
692	Reused stock brick	1	1780	1900	1850	1900
726	Machined Brick	3	1850	1940	1850	1940
730	Machined Brick	2	1850	1940	1850	1940
748	Machined Brick	2	1850	1940	1850	1940
753	Reused stock brick	2	1666	1850	1666	1850
764	Reused stock brick and fresh machined brick	3	1666	1900	1850	1900
767	Machined Brick	1	1850	1900	1850	1900
774	Reused stock brick	2	1770	1850	1770	1850
775	Machined Brick	2	1850	1940	1850	1940
776	Reused stock and Machined Brick	2	1770	1940	1850	1940
781	Reused stock and fresh machined brick	2	1770	1940	1870	1940
783	Machined Brick	1	1850	1940	1850	1940

Recommendations

Rationalisation

Initial Discard – *152 bricks (72.4%)* Phase 1 excavations - *59 bricks (72%)*

Of the remaining whole bricks (83) a further reduction (30-40%). Leaving about 30-40 bricks.
But retention of
Some bricks from construction walls of the earliest development (Phase 5a of workshops A and D [6], [9], [11], [13], [83] and some internal structures.
A representation of the different forms and stamps of kiln bricks from the later 5b development.
Retention of millstone wheel and some artificial and natural stone samples used as machined bases.
Bricks associated with the construction of the Phase 6 and 7 Forge.

Recommendation

That some of these whole brick samples are retained for further analysis by local industrial societies and kiln brick stone fabrics retained as a small reference collection.

Bibliography

Dimes, F. G. (1980). Petrological report. In C. Hill, M. Millett & T. F. C. Blagg, *The Roman Riverside Wall and Monumental Archway in London. Excavations at Baynards Castle, Upper Thames Street, London 1974-76.* London and Middlesex Archaeological Society Special Paper 3, London, London and Middlesex Archaeological Society: 198-200.

Hayward, K.M.J. in prep. The geology of the materials. In Henig, M. *Corpus Signorum Imperii Romani. Great Britain. London and the South-East.*

Henig, M. in prep. *Corpus Signorum Imperii Romani. Great Britain. London and the South-East.*

Hill, C., Millett, M. & Blagg, T. F. C. (1980). *The Roman Riverside Wall and Monumental Archway in London. Excavations at Baynards Castle, Upper Thames Street, London, 1974-76.* London and Middlesex Archaeological Society Special Paper 3. London, London and Middlesex Archaeological Society.

APPENDIX 3: POTTERY AND GLASS ASSESSMENT (CHRIS JARRETT, PCA)

Introduction

A small sized assemblage of pottery was recovered from the site (one box). None of the sherds show evidence for abrasion and were therefore deposited fairly rapidly after breakage. The pottery is very fragmented but most forms are identifiable. Pottery was recovered from two contexts and all as small groups (under 30 sherds).

All the pottery (eleven sherds and none are unstratified) was examined macroscopically and microscopically using a binocular microscope (x20), and recorded in an ACCESS database, by fabric, form, decoration, sherd count and estimated number of vessels. The classification of the pottery types is according to the Museum of London Archaeological Service. The pottery is discussed by types and its distribution.

THE POTTERY TYPES

NON-LOCAL

Sunderland coarse ware (SUND), 1800-1900, one sherd, form: handled bowl.

INDUSTRIAL FINEWARES

Refined white earthenware with slip decoration (REFW SLIP), 1805-1900, one sherd, form: bowl with horizontal blue band and green-slip lines.

Transfer-printed refined white ware (TPW), 1780-1900, four sherd, form: flatware with illegible maker's stamp in a knot.

Transfer-printed refined white ware with new colour decoration (type 4) (TPW 4), 1825-1900, two sherds; form: bowl, flat ware (marked and stamped with 'G F B' in a knot and 'CHINTS': G. F. Bowers, Tunstall, *c.*1842-68).

Yellow ware (YELL), 1825-1900, two sherds, form: rounded bowl.

PORCELAIN

English porcelain with under-glaze transfer-printed decoration (ENPO UTR), 1760-1900, one sherd, form: rounded bowl. Possibly 19th-century Continental porcelain (CONP), 1710-1900.

Distribution

The distribution of the pottery is shown in Table 1, which shows for each context the number of sherds, a spot date and information on the pottery types present, as well as the dates for the range and the latest type(s) present.

Context	Sherd count	Pottery types	Date range of pottery types	Latest dated pottery type	Spot date
[146]	8	REFW SLIP, TPW, TPW4 (marked and stamped with 'G F B' in a knot and 'CHINTS': G. F. Bowers, Tunstall, *c.*1842-68), YELL.	1780-1900	1825-1900	1825-1900
[361]	3	ENPO UTR, SUND, TPW4.	1760-1900	1825-1900	1825-1900

Table 1. WYM04. Distribution of the pottery types.

Significance, potential, research aims and recommendations for further work.

The pottery has no significance at a local, national or international level and is a mundane assemblage representing fairly typical pottery types found in London during the 19th century. Its main potential is as a dating tool for the contexts it was found in. None of the pottery requires illustration. There are no research aims suggested for the pottery and no recommendations for further work. Should a publication be required for the excavation, then information should be taken from this report.

APPENDIX 4: TIMBER ASSESSMENT (DAMIAN GOODBURN)

BACKGROUND

This report is intended to provide a summary description and assessment of the small assemblage of waterlogged historic woodwork found at this site. Readers should consult the main site assessment report for an overall description of the site and its archaeological sequence etc.

Here we are concerned only with the pieces of woodwork and wider inferences that can be drawn from the material. The associated finds indicate that the contexts from which the timber items are derived are of 19th century date.

The archaeology of the London region is well known for the investigations of medieval and Roman waterfront sites, and for the last 15 years many post-medieval and early industrial period sites have also been systematically examined. This has produced a large corpus of records of many types of woodwork from waterfront carpentry to cooperage, and ship, barge and boat building. This writer has been involved in most of the specialist recording of this material and related woodwork from other parts of southern Britain. The following summary has been informed by this previous work.

METHODOLOGY

This writer was not involved in recording during the excavation and the following only concerns the five lifted items of worked timber passed on to the writer in the autumn of 2007. The timbers were washed and carefully cleaned off- site and then recorded using scale drawing, sketches and pro-forma timber sheets. The records are consistent with standards set out in the Museum of London Archaeological Site Manual and the English Heritage Guidelines on Waterlogged Wood. None of the oak timber was deemed suitable for tree-ring study due to the lack of sapwood, loss of heartwood to burning and comparatively late date of associated pottery. The specialist records comprise- one sheet of scale timber drawings and three pro-forma timbers sheets with measured sketches.

THE TIMBERS

A Curious Section of Charred Ship or Barge Planking [383]

The largest timber recorded was aptly described as a 'holey plank' on site. It was a section of substantial, tangentially faced, oak planking 1.03m long by 410mm wide and 90mm thick. It was heavily charred before burial, which rounded the edges and enlarged holes pierced in it. Originally it would also have been a little wider and thicker. There are 10 holes through the faces, the larger of which (c. 25mm dia) are set on a staggered pattern typical of the holes in carvel-style ship planking. There are also several 20mm diameter holes and two blind iron spike holes. The former may have been for through bolts, and the latter for repair planks or sheathing. All these features, the proportions and a find spot near known ship breakers would fit an origin in a large carvel built ship of the mid 18th to early 19th centuries.

However, the edges of the plank also had 20mm holes bored in c. 70mm set 0.8m apart. That is the edges had been fastened with what must have been metal dowels. This is not a known feature of carvel shipbuilding but is known in a distinctive regional style of barge building. In this case the long, comparatively weak, flat bottoms of Thames Sailing Barges and punt-shaped lighters were often made in one layer of edge-fastened thick planking. This was largely tree nailed to the floor timbers (lowest cross wise frame timbers). The thickness of this plank suggests an origin in the largest sized vessels of this type, possibly a large coasting sailing barge rather than a lighter. Earlier the edge fastening was carried out using free tenons of oak.

The oak timber used was slow grown and knot free. The timber derived from a 'trample' (i.e. dump?) layer over the alluvium [366]. Such second hand planking would be much in demand for revetments, foundation rafts, ancillary buildings and fuel.

A Charred Plank Off-cut [384] from [366]

This thick oak plank appears to have been cut to length by sawing in recent times leaving a length of 0.67m by 240mm wide by 80mm thick. It was heavily charred before being dumped in this layer. The charring rounded the outline of the item, and it has no tool marks or other distinguishing marks or fastenings. It may well have been an off-cut from ship braking work in the area. From the 18th century onward oak was only sparingly used in land carpentry in the region and much of that was second hand nautical timber.

Three Small Woodwork Fragments [363] from the Drain Fill Deposit [364]

All of this material was incorporated in the drain backfill and had probably just been lying on the contemporary surface. This group of small items of woodwork included a broken abraded fragment of oak 0.34m long x 60mm x 20mm which had part of a c. 25mm treenail hole preserved. It probably derived from local ship breaking. The next largest fragment was a sliver of softwood with the impressions of two mortice bases in it 0.24m long, this probably derived from the repair or cutting up of joinery work of some type. The last fragment was a rectangle of softwood 60mm x 50mm x 12mm thick. It had sawn ends and probably derived from carpentry or joinery where housing or halving joints were being made.

Further work

A short up-dated note to accompany a figure based on the drawing of timber [383] could be produced with full references if required.

APPENDIX 5: ENVIRONMENTAL ASSESSMENT (ARCHAEOSCAPE)

C.R. Bachelor, N.P. Branch, C.P. Green and D. Young

ArchaeoScape, Department of Geography, Royal Holloway University of London, Egham Hill, Egham, Surrey, TW20 OEX, UK

INTRODUCTION

This report summarises the findings arising out of the environmental archaeological assessment undertaken by *ArchaeoScape* in connection with the proposed development at the former Millwall Iron Works, Westferry Road, London Borough of Tower Hamlets (Site Code: WYM07; National Grid Reference: TQ 3764 7853). The former Millwall Iron Works is located on the floodplain of the River Thames and during recent archaeological investigations undertaken by Pre-Construct Archaeology Ltd, column and bulk samples for environmental archaeological assessment, and possible future analysis, were obtained from an evaluation trench (Trench 1). Trench 1 was sealed by modern made ground, which was underlain by a stratigraphic sequence comprising layers of alluvial clays and peat, which in turn overlay natural sands.

The overarching aim of the environmental archaeological assessment was to evaluate the potential of the sedimentary sequence for reconstructing the environmental history of the site and its environs. In particular, the assessment focussed on evaluating the potential for quantifying the impact of human activities on the environment, and the response of humans to natural environmental change. The assessment consisted of the following:

Recording the lithostratigraphy (all column samples) and quantifying the organic matter content (column samples <1>, <2> and <3>) to provide a preliminary reconstruction of the sedimentary history

Assessment of the preservation and concentration of pollen grains and spores (column samples <1>, <2> and <3>) to provide a preliminary reconstruction of the vegetation history, and to detect evidence for human activities e.g. woodland clearance and cultivation

Assessment of the preservation and concentration of macroscopic plant (seeds, wood) remains from selected bulk samples (<4>, <5>, <6> and <7>) to provide a preliminary reconstruction of the vegetation history and general environmental context of the site

Radiocarbon dating to provide a provisional geochronological framework for the stratigraphic sequence (column samples <2> and <3>).

GEOLOGICAL CONTEXT

The site is located on the floodplain of the Lower Thames close to the southern end of the substantial meander core known as the Isle of Dogs and *c.* 0.2km from the modern waterfront. The British Geological Survey (1:50,000 Sheet 270 South London 1998) shows the site underlain by Alluvium over bedrock Thanet Sand. Gibbard (1994) illustrates a section based on borehole records, extending from Greenwich across the Thames to the Isle of Dogs and *c.* 0.5km to the east of the Millwall Ironworks site. The boreholes record an uneven bedrock surface between -5m and -10m OD overlain by a variable thickness of the Late Devensian Shepperton Gravel.

The surface of the Shepperton Gravel is uneven at levels between -5m and -1m OD and is overlain by up to 7m of Holocene Tilbury Deposits, the downstream equivalent of the Staines Alluvial Deposits of the Middle Thames area. Gibbard (1994) notes the presence of 'two possible biogenic beds' at Cubitt Town (NGR: TQ 382 787) and tentatively relates them to the Tilbury III and IV units of Devoy (1979). However, boreholes elsewhere in the Isle of Dogs record only one 'peat', generally towards the bottom of the Holocene alluvial sequence with an upper surface at levels between -3m and 1m OD. The natural alluvial sequence is overlain by Made Ground in most places in the Isle of Dogs and in some places may also have been truncated in the course of successive phases of site development.

METHODS

Field investigations

Three column samples (<1> and <2>, and <3>) and four bulk samples (<4>, <5>, <6>, <7>), each between 15cm and 20cm in thickness, were recovered from Trench 1 (Table 1).

Table 1: Details of samples taken at Former Millwall Iron Works, Westferry Road, London Borough of Tower Hamlets (WYM07)

Sample type	Sample number	Height at top (m OD)	Height at base (m OD)
Column	1	0.77	0.27
Column	2	-0.31	-0.81
Column	3	-0.68	-1.18
Bulk	4	0.87	0.67
Bulk	5	-0.15	-0.35
Bulk	6	-0.35	-0.52
Bulk	7	-1.03	-1.18

Lithostratigraphic descriptions

The lithostratigraphy of all column samples was described in the laboratory using standard procedures for recording unconsolidated sediment and peat, noting the physical properties (colour), composition (gravel, sand, clay, silt and organic matter), unit boundaries and inclusions (e.g. artefacts) (Tables 2, 4 and 5, and Figure 1).

Organic matter determinations

Seven sub-samples were taken from column sample <1> and six sub-samples from each of column samples <2> and <3> for determination of the organic matter content (Table 3 and Figures 2 to 4). These records were important for two reasons: (1) they identified lithostratigraphic units with a higher organic matter content that may be suitable for radiocarbon dating, and (2) they identified increases in organic matter possibly associated with more terrestrial conditions. The organic matter content was determined by standard procedures involving: (1) Drying the sub-sample at 110^{0}C for 12 hours to remove excess moisture; (2) Placing the sub-sample in a muffle furnace at 550°C for 2 hours to remove organic matter (thermal oxidation), and (2) Re-weighing the sub-sample obtain the 'loss-on-ignition' value (Bengtsson and Enell 1986).

Radiocarbon dating

A sub-sample was taken from base of the peat in column sample <3> (unit 1; context [17]; -1.04 to -1.06m OD) and from the top of the peat in column sample <2> (unit 2; context [17]; -0.47 to -0.49m OD). These were submitted for radiocarbon dating to Beta Analytic Inc, Florida (Table 6). The results have been calibrated using OxCal v4.0.1 Bronk Ramsey (1995; 2001; 2007) and IntCal04 atmospheric curve (Reimer *et al* 2004).

Pollen assessment

Seven sub-samples were taken from column sample <1>, and 6 from each of column samples <2> and <3> for assessment of the pollen content (Tables 7 to 9). The pollen was extracted as follows: (1) Sampling a standard volume of sediment (1ml); (2) Deflocculating of the sample in 1% Sodium pyrophosphate; (3) Sieving of the sample to remove coarse mineral and organic fractions (>125µ); (4) Acetolysis; (5) Removal of finer minerogenic fraction using Sodium polytungstate (specific gravity of 2.0g/cm^3); (6) 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. Pollen grains and spores were identified using the Royal Holloway (University of London) pollen type collection and the following sources of keys and photographs: Moore *et al* (1991); Reille (1992). Plant nomenclature follows the Flora Europaea as summarised in Stace (1997). The assessment procedure consisted of scanning the prepared slides at 2mm intervals along the whole length of the coverslip and recording the concentration and state of preservation of pollen grains and spores, and the principal pollen taxa.

Plant macrofossil assessment

Sub-samples from the four selected bulk samples (<4>, <5>, <6> and <7>) recovered from the site were processed for the plant macrofossil assessment. The samples were wet-sieved using 300 micron and 1mm mesh sizes. The residues were scanned using a low power zoom-stereo microscope. Identifications are currently being made with reference to the modern seed collection at Royal Holloway University London, and Berggren (1981) and Anderberg (1994). Plant nomenclature follows Stace (1997) (Table 10).

RESULTS AND INTERPRETATION OF THE LITHOLOGICAL ASSESSMENT

At the base of the trench, natural sands were recorded in the field by Pre-Construct Archaeology Ltd between -1.25m and -1.18m OD. These sands were overlain by wood and herbaceous peat (*c.* 60% organic matter; Tables 2, 3 and 4; Figures 1, 2 and 3) between -1.18m and -0.35m OD (context [17]). These sediments most likely indicate the transition from a moderate to high energy fluvial system to semi-terrestrial peat formation. This transition may have been brought about by: (1) a decrease in the rate of relative sea-level rise, or (2) by a change in local factors, such as the natural lateral migration away from the site of a river channel creating a back-swamp area. Between -0.45m and -0.35m OD, there is a gradual change in lithostratigraphy, indicated by decreasing organic matter content from *ca.* 65% to 30% (Tables 3 and 4; Figures 1 and 3). This transition from context [17] to [16] is suggestive of an increase in bog surface wetness, decreased stability and eventual fluvial inundation of the peat surface (indicated by the deposition of clay-rich sediments above -0.35m OD). This environmental transition may have been caused by one or more of the following: (1) an increase in the rate of relative sea level rise (see Sidell *et al* 2000; Haggart 1995; Devoy 1979; 1982); (2) a change in the proximity of the river channel noted above i.e. its lateral migration towards the site, and (3) human activity on the dry land, such as woodland clearance, causing increased surface runoff onto the floodplain surface. These mineral rich alluvial sediments continued to accumulate until *c.* 1.00m OD (contexts [16] and (15); Tables 3, 4 and 5; Figures 1, 3 and 4), and were overlain by made ground deposits (context [14]) according to the field records made by Pre-Construct Archaeology Ltd.

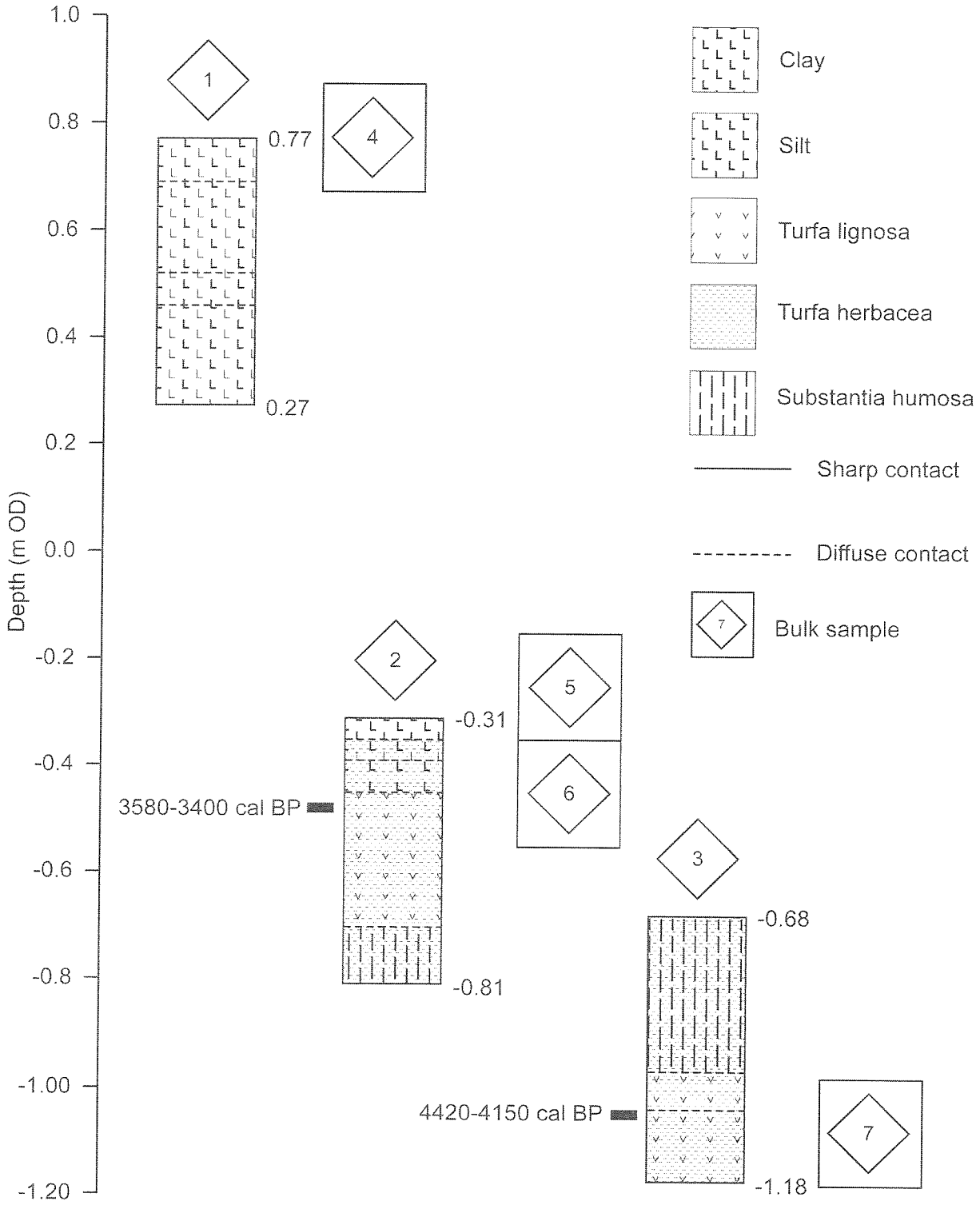


Figure 1: Lithostratigraphy of column samples <1>, <2> and <3> obtained from Former Millwall Iron Works, Westferry Road, London Borough of Tower Hamlets (WYM07)

Table 2: Lithostratigraphic sequence from column sample <3>, Former Millwall Iron Works, Westferry Road, London Borough of Tower Hamlets (WYM07)

Depth (m OD)	Unit number	Context number	Description
-0.68 to -0.97	3	[17]	10YR 2/1; Sh3, $Th^4$1, Tl^3+; Black very organic rich and well humified herbaceous peat with well humified wood peat inclusions; diffuse contact into:
-0.97 to -1.04	2	[17]	10YR 2/1; $Tl^1$3, Sh1; Black poorly humified organic rich wood peat; diffuse contact into:
-1.04 to -1.18	1	[17]	10YR 2/1; Sh2, $Tl^2$2, Th^4+; Black organic rich moderately humified wood peat with herbaceous peat inclusions.

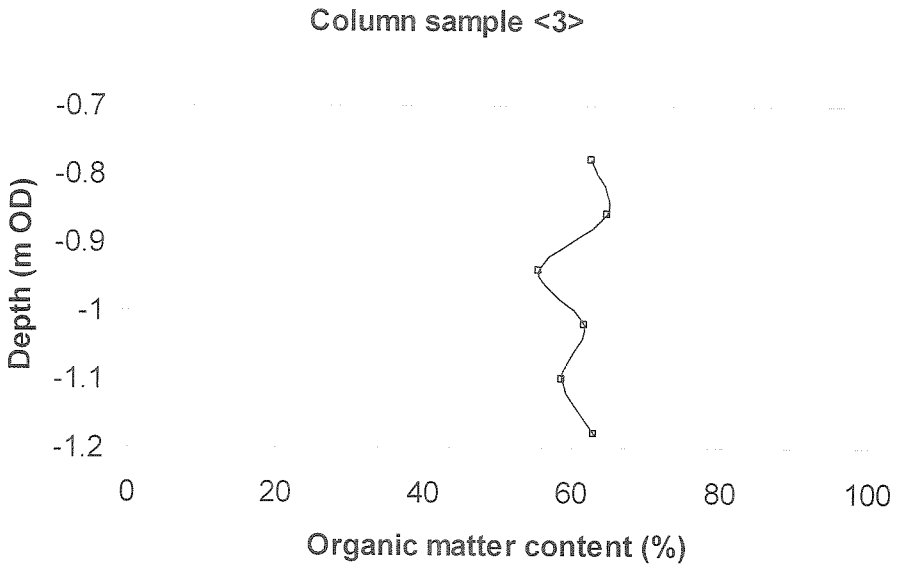


Figure 2: Organic matter content of column sample <3>

Table 3: Organic matter content of column samples <1>, <2>, and <3>

Column sample	Context number	Depth (m OD)		Organic matter content (%)
		From	To	
3	[17]	-1.17	-1.18	63.00
3	[17]	-1.09	-1.1	58.57
3	[17]	-1.01	-1.02	61.53
3	[17]	-0.93	-0.94	55.53
3	[17]	-0.85	-0.86	64.67
3	[17]	-0.77	-0.78	62.38

2	[16]	-0.69	-0.7	67.56
2	[17]	-0.61	-0.62	60.70
2	[17]	-0.53	-0.54	71.80
2	[17]	-0.45	-0.46	65.81
2	[17]	-0.37	-0.38	50.63
2	[17]	-0.3	-0.31	10.80
1	[15]	0.28	0.27	6.79
1	[15]	0.36	0.35	7.31
1	[15]	0.44	0.43	7.21
1	[15]	0.52	0.51	7.68
1	[15]	0.6	0.59	8.15
1	[15]	0.68	0.67	8.92
1	[15]	0.76	0.75	9.49

Table 4: Lithostratigraphic sequence from column sample <2>, Former Millwall Iron Works, Westferry Road, London Borough of Tower Hamlets (WYM07)

Depth (m OD)	Unit no.	Context no.	Description
-0.31 to -0.35	5	[16]	5YR 4/1; As4, Gg+; Dark grey clay with gravel inclusions; diffuse contact into:
-0.35 to -0.39	4	[17]	5YR 4/1 and 2Y 2.5/1; Sh2, Ag1, As1; Mottled dark grey and black very organic rich silty clay; diffuse contact into:
-0.39 to -0.45	3	[17]	10YR 2/1; Sh3, As1, Tl^3+, Th^4+; Black very organic rich clay with well humified wood and herbaceous peat inclusions; diffuse contact into:
-0.45 to -0.70	2	[17]	7.5YR 2.5/1; Sh3, $Tl^3$1, Th^4+, As+; Black very organic rich well humified wood peat with well humified herbaceous peat and clay inclusions; diffuse contact into:
-0.70 to -0.80	1	[17]	10YR 2/1; Sh3, $Th^4$1, Tl^3+; Black very organic rich and well humified herbaceous peat with well humified wood peat inclusions.

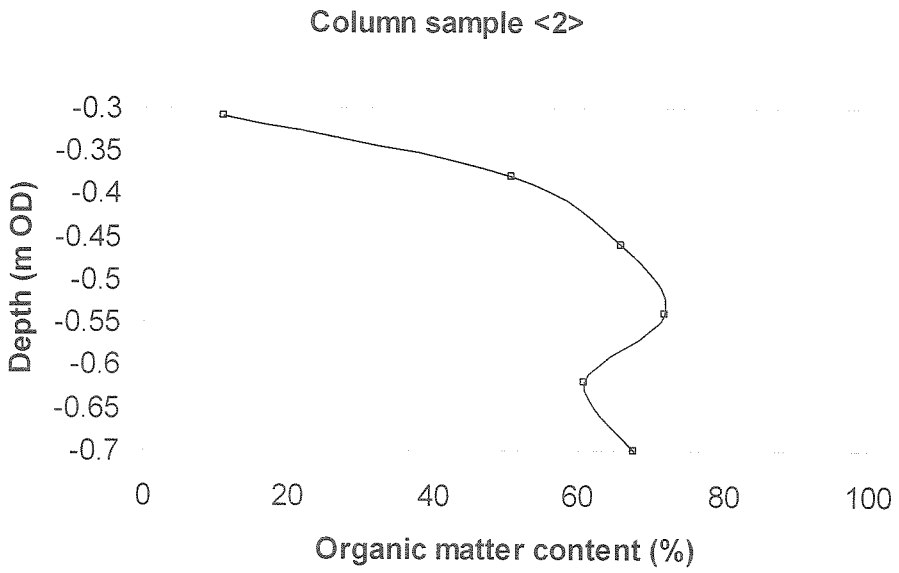


Figure 3: Organic matter content of column sample <2>

Table 5: Lithostratigraphic sequence from column sample <1>, Former Millwall Iron Works, Westferry Road, London Borough of Tower Hamlets (WYM07)

Depth (m OD)	Unit number	Context number	Description
0.77 to 0.69	4	[15]	10YR 3/2; As3, Ag1, chalk+; Very dark greyish brown silty clay with chalk inclusions; diffuse contact into:
0.69 to 0.54	3	[15]	10YR 4/2; Ag3, As1, charcoal+, Gg+; Dark greyish brown clayey silt with gravel and charcoal inclusions; diffuse contact into:
0.54 to 0.46	2	[15]	2.5YR 3/2; Ag3, As1, Gg+; Very dark greyish brown clayey silt with gravel inclusions; diffuse contact into:
0.46 to 0.27	1	[15]	10YR 3/2; Ag3, As1, Gg+; Very dark greyish brown clayey silt with gravel inclusions.

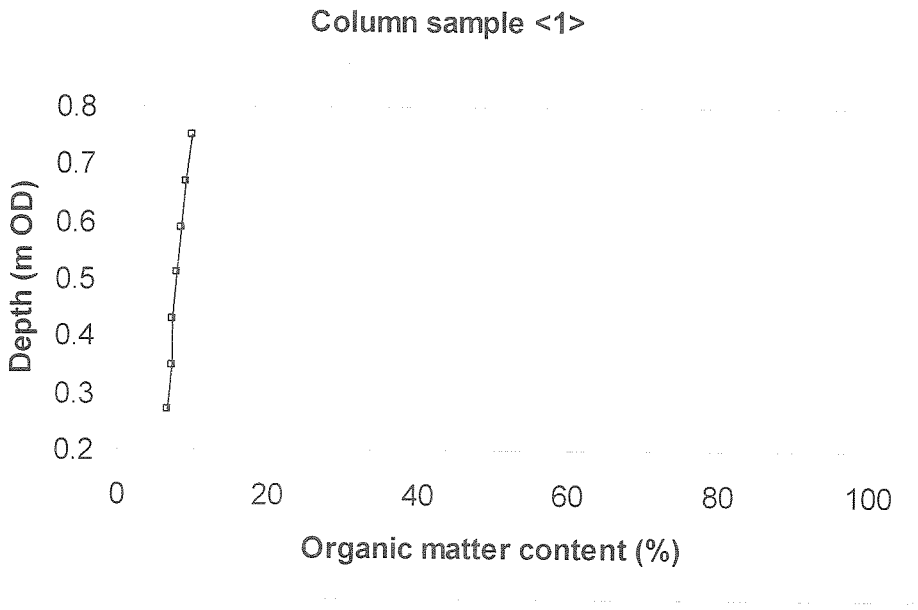


Figure 4: Organic matter content of column sample <1>

RESULTS AND INTERPRETATION OF THE RADIOCARBON DATING

The base of the peat (column sample <3>; unit 1; context [17]) at -1.04 to -1.06m OD has been radiocarbon dated to 4420-4150 cal yr BP, and the top of the peat (column sample <2>; unit 2; context [17]) at -0.47 to -0.49m OD has been dated to 3580-3400 cal yr BP (Table 6) The δ13C (‰) values are consistent with that expected for peat, and there is no evidence for mineral or biogenic carbonate contamination. These dates may be equated with the Late Neolithic to Early Bronze Age (Beta-235788) and Middle Bronze Age (Beta-235787) cultural periods respectively.

Table 6: Results of the radiocarbon dating of column sample <2> and column sample <3>, Former Millwall Iron Works, Westferry Road, London Borough of Tower Hamlets (WYM07)

Lab Code / Method	Material	Unit no.	Context number	Column sample	Depth (m OD)	Un-calibrated Radiocarbon Years Before Present (yr BP)	Calibrated age BC / AD (BP) (2-sigma, 95.4% probability)	δ13C (‰)
BETA-235787 AMS standard delivery	Top of Peat	2	[17]	2	-0.47 to -0.49	3270 +/- 40	1630 to 1450 cal BC (3580 to 3400 cal BP)	-28.9
BETA-235788 AMS standard delivery	Base of Peat	1	[17]	3	-1.04 to -1.06	3870 +/- 40	2470 to 2200 cal BC (4420 to 4150 cal BP)	-28.8

RESULTS AND INTERPRETATION OF THE POLLEN ASSESSMENT

The results of the pollen-stratigraphic assessment of column samples <1>, <2> and <3> indicate low to moderate pollen preservation and concentration (Tables 7 to 9). The main taxa identified in context [17], between -1.18m and -0.35m OD, were *Alnus* (alder), *Quercus* (oak), *Corylus* type (e.g. hazel), *Tilia* (lime) and *Fraxinus* (ash). These taxa indicate the presence of a wetland community comprising alder woodland, most likely forming fen carr, with an understorey of sedges (Cyperaceae) and ferns (*Dryopteris*). On the nearby dry land, oak and lime with occasional elm (*Ulmus*) dominated the vegetation cover, although the presence of hazel and ivy (*Hedera*) shrub land suggests that areas of less dense woodland existed, permitting light loving taxa to colonise. Supporting this interpretation is the presence of bracken ferns (*Pteridium aquilinum*), and occasional grasses, perhaps suggesting the presence of woodland glades.

Above -0.35m OD, within contexts [16] and [15], the pollen assemblage is very different to context [17]. Pollen indicative of mixed deciduous woodland, for example, alder and oak, occur far less frequently than in context [17]. Instead, the assemblage is dominated by herbaceous taxa, in particular grasses and a range of herbs indicative of retrogressive succession towards wetter and/or more open conditions. Taxa such as grasses (Poaceae), buttercups (*Ranunculus* type), daisies (Lactuceae), and thistles (*Cirsium* type) indicate the possible presence of disturbed ground/meadowland communities, which in addition to the regular occurrence of *Chenopodium* type pollen (e.g. saltwort), most likely represents saltmarsh communities growing as a result of estuarine expansion in response to rising relative sea level (e.g. Devoy 1979).

In addition, the decline of dry land woodland, such as lime, above -0.35m OD, the possible identification of *Cereal* type pollen at -0.32 to -0.31m OD (e.g. wheat or barley), and presence of taxa such as *Sinapis* type (e.g. charlock) indicate an environment modified by human activities, resulting in the creation of new ecosystems, such as cultivated fields. Supporting this interpretation is the presence of other light loving taxa such as hazel, and the presence of regional, long distance pollen types such as pine (*Pinus*).

Table 7: Pollen-stratigraphic assessment of column sample <1>, Former Millwall Iron Works, Westferry Road, London Borough of Tower Hamlets (WYM07)

Depth (m OD)	Lithostratigraphic unit	Context number	Main Taxa present	Common name	Carbonaceous particles	Concentration 0 (none) to 4 (High)	Preservation 0 (none) to 4 (High)
0.76 to 0.75	4	[15]			2	0	0
0.68 to 0.67	3	[15]	Alnus *Chenopodium type* *Corylus* type cf Poaceae cf *Ranunculus* type *Sinapis type*	Alder e.g. Fat hen e.g. Hazel cf Grass family cf e.g. Creeping buttercup e.g. Charlock	1	1-2	1-2
0.60 to 0.59	2	[15]	cf *Fraxinus* cf *Polypodium* *Tilia*	cf Ash cf Polypody Lime	2	1	1
0.52 to 0.51	2	[15]	*Alnus* *Corylus* type *Chenopodium* type Dryopteris Lactuceae Poaceae	Alder e.g. Hazel e.g. Fat hen Fern Daisy family e.g. Charlock	1	2	1
0.44 to 0.43	1	[15]	*Alnus* *Chenopodium* type *Corylus* type *Dryopteris* Lactuceae *Pinus* Poaceae	Alder e.g. Fat hen e.g. Hazel Fern Daisy family Pine Grass family	1	2-3	2

			Quercus *Tilia*	Oak Lime			
0.36 to 0.35	1	[15]	*Alnus* *Chenopodium type* *Corylus* type *Fraxinus* Lactuceae cf *Sinapis type* *Sphagnum*	Alder e.g. Fat hen e.g. Hazel Ash Daisy family cf e.g. Charlock Sphagnum	1	3	1-2
0.27 to 0.26	1	[15]	*Alnus* *Chenopodium type* *Dryopteris* cf *Fraxinus* cf *Hedera* Lactuceae *Pinus* Poaceae *Polypodium* *Pteridium aquilinum* *Tilia*	Alder e.g. Fat hen Fern cf Ash cf Ivy Daisy family Pine Grass family Polypody Bracken Lime	1	3	1-2

Table 8: Pollen-stratigraphic assessment of column sample <2>, Former Millwall Iron Works, Westferry Road, London Borough of Tower Hamlets (WYM07)

Depth (m OD)	Lithostratigraphic unit	Context number	Main Taxa present	Common name	Carbonaceous particles	Concentration 0 (none) to 4 (High)	Preservation 0 (none) to 4 (High)
-0.31 to -0.32	5	[16]	*Alnus* Artemisia *Betula* cf *Cereale* type *Chenopodium* type *Cirsium* type *Corylus* type Lactuceae *Pinus* *Poaceae*	Alder Mugwort Birch cf e.g. Bread wheat e.g. Fat hen e.g. Spear thistle e.g. Hazel Daisy family Pine Grass family	1	3	2

			Pteridium aquilinum *Quercus* cf *Sinapis* type	Bracken Oak cf e.g. Charlock			
-0.37 to -0.38	4	[17]	*Alnus* *Cyperaceae* cf *Dryopteris* *Fraxinus* *Pteridium aquilinum* *Quercus* *Rumex* undifferentiated	Alder Sedge family cf Fern Ash Bracken Oak e.g. Common Sorrel	1	2	2-3
-0.45 to -0.46	2	[17]	*Alnus* *Fraxinus* *Pteridium aquilinum* *Quercus* cf *Ulmus*	Alder Ash Bracken Oak cf Elm	1	2	1-2
-0.53 to -0.54	2	[17]	*Alnus* *Hedera* *Pteridium aquilinum* cf *Quercus* *Salix*	Alder Ivy Bracken cf Oak Willow	1	1-2	2-3
-0.61 to -0.62	2	[17]	*Alnus* *Corylus type* *Dryopteris* *Quercus*	Alder e.g. Hazel Fern Oak	1	2	2
-0.70 to -0.69	2	[17]	*Alnus* *Quercus* *Tilia*	Alder Oak Lime	1	2-3	2-3

Table 9: Pollen-stratigraphic assessment of column sample <3>, Former Millwall Iron Works, Westferry Road, London Borough of Tower Hamlets (WYM07)

Depth (m OD)	Lithostratigraphic unit	Context number	Main Taxa present	Common name	Carbonaceous particles	Concentration 0 (none) to 4 (High)	Preservation 0 (none) to 4 (High)
-0.77 to -0.78	3	[17]	*Alnus* *Corylus* type	Alder e.g. Hazel	0-1	2	2

			Fraxinus *Pinus* *Polypodium* *Pteridium aquilinum* *Quercus*	Ash Pine Polypody Bracken Oak			
-0.85 to -0.86	3	[17]	*Alnus* cf *Corylus* type cf *Chenopodium* type *Quercus* *Tilia*	Alder cf e.g. Hazel cf e.g. Fat hen Oak Lime	0-1	1-2	1-2
-0.93 to -0.94	3	[17]	*Alnus* *Dryopteris* *Polypodium* *Tilia*	Alder Fern Polypody Lime	0-1	1	2
-1.01 to -1.02	2	[17]	*Alnus* Cyperaceae *Dryopteris* *Hedera* *Plantago lanceolata* *Polypodium* *Quercus*	Alder Sedge family Fern Ivy Ribwort plantain Polypody Oak	0-1	2	2
-1.09 to -1.10	1	[17]	*Alnus* *Corylus* type *Dryopteris* *Quercus* *Tilia*	Alder e.g. Hazel Fern Oak Lime	0-1	1-2	1-2
-1.17 to -1.18	1	[17]	*Alnus* *Corylus* type *Fraxinus* *Quercus* *Tilia* *Ulmus*	Alder e.g. Hazel Ash Oak Lime Elm	0-1	2-3	2-3

RESULTS AND INTERPRETATION OF THE PLANT MACROFOSSIL ASSESSMENT

Plant macrofossil assessments were carried out on bulk samples <4>, <5>, <6> and <7> (Table 10). The concentration of remains was very limited in all samples. In context [17] waterlogged plant remains and charcoal were present. Two taxa were identified, both typical of wetland environments: rannoch-rush (*Scheuchzeria palustris*), was recorded in sample <7> and common reed (*Phragmites australis*) was recorded in sample <6>. In context [16], (sample <5>) no identifiable taxa were recorded. In context [15], water-crowfoot (*Ranunculus* sp *batrachium*), a subgenus that grows in water or mud, and charred wheat (*Triticum* sp) was recorded in sample <4>. The latter may be contamination from the overlying made ground or evidence for Late Holocene cultivation on the floodplain surface.

Table 10: Plant macrofossil assessment of bulk samples <4>, <5>, <6>, and <7>, Former Millwall Iron Works, Westferry Road, London Borough of Tower Hamlets (WYM07)

Depth (m OD)	Sample number	Context number	Size	Waterlogged seeds	Charred seeds	Waterlogged wood	Charcoal	Charred bone	Monocots	Minerogenic material	Molluscs	Main taxa
0.87 to 0.67	<4>	[15]	>1mm	1	4		4 (3 pieces)			4	3	
	<4>	[15]	>300µm				1			4	3	charred *Triticum*, *Ranunculus* sp *batrachium*
-0.15 to -0.35	<5>	[16]	>1mm				2			4		
	<5>	[16]	>300µm		1	1	1		4	5		
-0.35 to -0.52	<6>	[17]	>1mm			3	2		3			
	<6>	[17]	>300µm			1	1		4			*Phragmites* sp
-1.03 to -1.18	<7>	[17]	>1mm	1		5			4			
	<7>	[17]	>300µm			1			5			*Scheuchzeria palustris*

Key	Individuals
1 =	1 to 25
2 =	26 to 50
3 =	51 to 75
4 =	76 to 100
5 =	101+

CONCLUSIONS AND RECOMMENDATIONS

The overarching aim of the environmental archaeological assessment was to evaluate the potential of the sedimentary sequence for reconstructing the environmental history of the site and its environs. In particular, the assessment focussed on evaluating the potential for quantifying the impact of human activities on the environment, and the response of humans to natural environmental change. The results indicate that peat formation commenced sometime prior to 2470 to 2200 cal BC (4420 to 4150 cal BP), during the Late Neolithic/Early Bronze Age cultural period, and continued after 1630 to 1450 cal BC (3580 to 3400 cal BP). The transition to semi-terrestrial conditions with peat formation during the Late Neolithic/Early Bronze Age was a response to changing environmental conditions, possibly a change in the proximity of the main river channel, and a decrease in flood amplitude and frequency, resulting in peat formation in extensive, low-lying areas. The renewal of alluvial sedimentation from the Middle Bronze Age indicates fluvial inundation of the site, most likely in response to rising relative sea levels recorded throughout the Lower Thames valley at this time (see Batchelor 2007; Sidell *et al* 2000; Haggart 1995; Devoy 1979; 1982).

The pollen and plant macrofossil data support this interpretation with evidence for a rich wet woodland plant community comprising alder, most likely forming fen carr, with an understory of sedges and grasses growing on the peat surface. On nearby dry land, oak and lime woodland with occasional elm dominated the vegetation cover, although the presence of shrub land suggests that areas of less dense woodland also existed. After 1630 to 1450 cal BC (3580 to 3400 cal BP), the pollen record is supportive of the stratigraphic record indicating retrogressive succession towards wetter, open conditions most likely dominated by salt marsh communities. More open environments on the dry land are also indicted after 1630 to 1450 cal BC (3580 to 3400 cal BP), by the low and sporadic values of lime and oak, together with an increase in non-arboreal and heliophilous arboreal taxa indicating probable modification of the landscape by human activities, which undoubtedly involved woodland clearance, cereal cultivation and grassland formation, and which may have occurred as a response to changes in the natural environment.

It is not recommended that further environmental archaeological work be carried out at the Former Millwall Iron Works, Westferry Road, London Borough of Tower Hamlets (WYM07) due to the poor preservation and concentration of the pollen grains and spores, and plant macrofossils. Nevertheless, the radiocarbon dated stratigraphic records contained in this assessment report will be usefully integrated into a publication on Middle and Late Holocene environmental changes in the Lower Thames Valley that is currently being compiled (Batchelor and Branch in prep).

REFERENCES

Anderberg, A. L. (1994) *Atlas of Seeds: Part 4*, Swedish Museum of Natural History, Risbergs Trycheri AB. Sweden: Uddevalla.

Batchelor, C.R. (2007) *Middle Holocene environmental changes and the history of yew woodland in the Lower Thames Valley*. Department of Geography. London, Royal Holloway, University of London, UK. Unpublished PhD thesis.

Bengtsson, L. and Enell, M. (1986) Chemical analysis, In (B.E. Berglund ed.) *Handbook of Holocene Palaeoecology and Palaeohydrology*, 423-454. Chichester: Wiley.

Berggren, G. (1981) *Atlas of Seeds: Part 3*, Swedish Museum of Natural History. Sweden: Berlings, Arlöv.

The British Geological Survey (1998) 1:50,000 Sheet 270 South London.

Batchelor and Branch, in prep. *Environmental History in the Lower Thames Valley.*

Bronk Ramsey, C. (1995) Radiocarbon calibration and analysis of stratigraphy: The Oxcal program. *Radiocarbon* **37 (2)**, 425-430.

Bronk Ramsey, C. (2001) Development of the Radiocarbon Program Oxcal, *Radiocarbon* **43 (2a)**, 355-363.

Bronk Ramsey, C. (2007) Deposition models for chronological records. *Quaternary Science Reviews* (INTIMATE special issue; http://c14.arch.ox.ac.uk/oxcal/ref.html#Ramsey:2007), in press.

Devoy, R.J.N (1979) Flandrian sea level changes and the vegetational history of the lower Thames valley. *Philosophical Transactions of the Royal Society of London*, **B285**, 355-410.

Devoy, R. J. N. (1982). Analysis of the geological evidence for Holocene sea-level movements in southeast England. *Proceedings of the Geologists' Association*, **93**, 65-90.

Gibbard, P.L. (1994) *Pleistocene History of the Lower Thames Valley*. Cambridge. Cambridge University Press.

Haggart, B.A. (1995). A re-examination of some data relating to Holocene sea-level changes in the Thames Estuary. In D.R. Bridgland (ed.), *The Quaternary of the lower reaches of the Thames Eastuary* (pp. 329-338)

Moore, P.D., Webb, J.A. and Collinson, M.E. (1991) *Pollen Analysis* (2nd Ed.). Oxford: Blackwell.

Reille, M. (1992) *Pollen et Spores d'Europe et d'Afrique du Nord.* Marseille : Laboratoire de Botanique Historique et Palynologie.

Sidell, J., Wilkinson, K., Scaife, R., & Cameron, N. (2000). *The Holocene Evolution of the London Thames*: Museum of London Archaeology Service.

Stace, C. (1997) *New Flora of the British Isles* (2nd ed.). Cambridge: Cambridge University Press.

Reimer, P.J., Baille, M.G.L., Bard, E., Bayliss, A., Beck, J.W., Bertrand, Blackwell, P.G., Buck, C.E., Burr, G.S., Cutler, K.B., Damon, P.E., Edwards, R.L., Fairbanks, R.G., Friedrich, M., Guilderson, T.P., Hogg, A.G., Hughen, K.A., Kromer, B., McCormac, G., Manning, S., Bronk Ramsey, C., Reimer, R.W., Remmele, S., Southon, J.R., Stuiver, M., Talamo, S., Taylor, F.W., van der Plicht, J. and Weyhenmeyer, C.E. (2004) IntCal04 terrestrial radiocarbon age calibration, 0-26 cal kyr BP, *Radiocarbon* **46 (3)**, 1029-1058.

APPENDIX 6: METALWORK ASSESSMENT (MARIT GAIMSTER, PCA)

The finds from Westferry Road included numerous iron objects, listed in Table 1. They were all recovered from the demolition dumps and layers overlying the excavated features and structures. The finds include tools and fittings relating to the documented ship-yard activities on site, notably numerous iron caps, a forelock bolt and two large spanners. Other iron objects may also relate to ship building, or may be structural fittings associated with the forge buildings, such as a joiner's dog and a strap tie. Actual iron-working tools are represented by two possible sets, one for working hot iron and the other for cold; both have burred heads (cf. Goodall 1993, 176 and fig. 125 nos. 1352 and 1353–60).

Recommendations

The iron objects significantly represent the documented shipyard activities in the late 19th and early 20th centuries and should be included in any further publication of the site. For this purpose some objects will require further identification. A range of significant tools and fittings should be drawn for illustration; these are all marked in Table 1. The slag should be seen by a slag specialist.

References:

I. H. Goodall, 1993. 'Iron metalworking tools', 174–77 in S. Margeson, *The Medieval and Post-Medieval Finds from Norwich Survey Excavations*, East Anglian Archaeology 58.

Phase 5: 1848–1859		
context	**description**	**recommendations**
201	large iron ?wedge; incomplete; tapering rectangular-section bar with burred end; W 80mm; L 300mm+; thickness (edge) 35mm	further identification illustrate
202	one lump of slag	
	the head of a circular oil/grease brush; diam. 45mm	illustrate
582	one lump of slag	
631	long iron pin; incomplete; threaded at one end with hexagonal nut extant; L 345mm	illustrate
666	rectangular 310 x 125+mm piece of iron plate; three true edges; thickness 10mm	
Phase 8: early to mid-20th century		
context	**description**	**recommendations**
14	iron square-section forelock bolt; complete; head flush with bolt on one side; L 150mm	illustrate
	iron ?connecting or coupling pin; flat spike for fixing vertically and an angled loop; L 150mm	further identification illustrate
	complete iron ?cold set; L 190mm W 40mm; burred rectangular head	illustrate
	iron ?hot set; hexagonal bar/handle with burred head widening into a flattened end	illustrate
	iron rod bent into u-shape at each end; ?chain link; L 300mm+	
	iron bolt with hexagonal head; L 190mm; rectangular washer/ retaining plate extant	
	iron packing; five 10-12mm square plates of differing thickness	
	two large iron ?washers; 190 and 200mm diam; both with wavy/petal-shaped inner edge; one has remnants of rilled ?concrete collar	further identification

		illustrate
97	two lumps of slag	
	Unphased/1930s demolition	
context	**description**	**recommendations**
+	some 80 iron slightly domed iron caps with central perforation at base; two main sizes of 20 and 25mm respectively; a handful of 15mm caps and one small cap of 8mm diam; in addition a large lump of iron caps concreted together	
	circular-section iron rod or handle; incomplete; L 1m+	
	large flat iron spanner; complete; L 720mm; internal W 235mm; short handle with central perforation	illustrate
	complete iron spanner with circular-section handle; L 520mm; internal W 40mm	illustrate
	circular iron washer; complete; diam. 80mm	
	iron strap tie; complete with circular hole for fixing at each end; W 45mm L370mm	illustrate
	iron joiner's dog; complete; W 380mm; spikes at 90° to each other	
361	several lumps of slag	
431	two lumps of slag	
434	fragment of thin iron plate; thickness 4mm	
435	one lump of slag	
451	two large lumps of slag	
464	small white-metal ?washer with toothed edge; diam. 21mm	
	several lumps of slag	
481	?threaded iron pin; incomplete; heavily encrusted; L 120mm	x-ray
487	iron joiner's dog; complete; W 430mm; spikes at 90° to each other	
	iron ?pneumatic drill piece; circular-section hafting with spatulate blade; incomplete or heavily worn end; full L 365mm	further identification
	iron bolt with hexagonal head; hexagonal nut extant along with one rectangular and one circular washer; L 130mm	
	iron drill bit with circular haft; complete; L 110mm	
	iron drill bit with circular haft; incomplete; L 120mm	
493	several lumps of slag	
499	several lumps of slag	
509	one lump of slag	
511	slag with hammerscale	
513	slag with hammerscale	
524	iron ?peg; L 120mm	further identification
	one compact and heavy piece of slag	
526	iron drill bit; end piece only; L 150mm	
	substantial iron square-section nail; complete; oval/hexagonal head; L 130mm	
	iron ?peg or wedge; straight rectangular-section bar; head flush with bolt on one side; L 145mm	further identification
	very large lump of slag	
534	one lump of slag	
535	slag with hammerscale	
544	six small rectangular or off-cut pieces of thin iron plate with blue or white plastic coating on one side; one strap with rivets at either end; W 9mm L 95mm	
545	several lumps of slag	
552	two lumps of slag	
554	slag with hammerscale	
573	small lump of slag	
580	one lump of slag	
604	one lump of slag	
607	slag with hammerscale	
611	small lump of slag	
615	one lump of slag	
617	iron pin with ?burred head; incomplete and heavily encrusted; L 155mm	x-ray
	one very large and numerous smaller lumps of slag	
635	one large lump of slag	

640	iron square-section nail; incomplete; L 60mm	
	iron screw; incomplete; L 60mm	
656	one large lump of slag	
658	one lump of slag	
726	two lumps of slag	
766	one lump of slag	

Table 1 Metal finds from WYM00

APPENDIX 7: OASIS REPORT FORM

OASIS ID: preconst1-49396

Project details

Project name	Millwall Iron Works, Westferry Road, Isle of Dogs
Short description of the project	A watching brief revealed the structural history of the Iron Works In two evaluation trenches peat dating from the Late Neolithic/Early Bronze Age to the Middle Bronze Age was revealed along the eastern and northern parts of the site. The peat was sealed by alluvial deposits and made ground. The earliest structural remains consisted of two mid 19th century aisled workshops that were part of the early iron forging and ship building works of C.J. Mare which was responsible for the construction and fitting-out of Brunel's Great Eastern Steam Ship. Later phases of construction included the construction of a further four structures including the Grade II listed Forge. Evidence of internal remodelling of the flues and pipework together with the remains of stone and concrete machine bases and tanks was revealed.
Project dates	Start: 28-03-2007 End: 30-07-2008
Previous/future work	No / No
Any associated project reference codes	WYM07 - Sitecode
Type of project	Recording project
Site status	Listed Building
Site status	Area of Archaeological Importance (AAI)
Current Land use	Industry and Commerce 1 - Industrial
Monument type	INDUSTRIAL BUILDING Post Medieval
Significant Finds	BUILDING MATERIAL Post Medieval
Investigation type	'Watching Brief'
Prompt	Direction from Local Planning Authority - PPG16

Project location

Country	England
Site location	GREATER LONDON TOWER HAMLETS TOWER HAMLETS Millwall Iron Works
Postcode	E14 9
Study area	7963.10 Square metres
Site coordinates	TQ 3764 7853 51.4884413004 -0.017299879324 51 29 18 N 000 01 02 W Point
Lat/Long Datum	Unknown
Height OD / Depth	Min: -1.18m Max: -0.28m

Project creators

Name of Organisation	Pre-Construct Archaeology Ltd
Project brief originator	CgMs Consulting
Project design originator	CgMs Consulting
Project director/manager	Chris Mayo

Project supervisor	Denise Mulligan
Type of sponsor/funding body	Developer
Name of sponsor/funding body	Glenkerrin UK Ltd

Project archives

Physical Archive recipient	LAARC
Physical Contents	'Ceramics','Glass','Metal'
Digital Archive recipient	LAARC
Digital Contents	'Ceramics','Glass','Metal'
Digital Media available	'Images raster / digital photography','Spreadsheets','Survey'
Paper Archive recipient	LAARC
Paper Media available	'Aerial Photograph','Context sheet','Correspondence','Drawing','Map','Matrices','Photograph','Plan','Report','Section','Survey ','Unpublished Text'

Project bibliography 1

Publication type	Grey literature (unpublished document/manuscript)
Title	An Archaeological Assessment of an Evaluation and Watching Brief on Land at 397-411 Westferry Road, Isle of Dogs, London Borough of Tower Hamlets
Author(s)/Editor(s)	Mulligan D
Date	2008
Issuer or publisher	PCA
Place of issue or publication	London
Description	Bound A4 Report
Entered by	Jon Butler (jbutler@pre-construct.com)
Entered on	18 November 2008