AN ARCHAEOLOGICAL EVALUATION AT THE FORMER CPS HAULAGE SITE, HAWKS ROAD, SALTMEADOWS, GATESHEAD, TYNE AND WEAR

PRE-CONSTRUCT ARCHAEOLOGY

An Archaeological Evaluation at the Former CPS Haulage Site, Hawks Road, Saltmeadows, Gateshead, Tyne and Wear

Central National Grid Reference: NZ 2595 6379

Site Code: HRG 10

Commissioning Client:

Prospect Archaeology Limited
Prospect House
Garden Lane
Sherburn-in-Elmet
North Yorkshire
LS25 6AT

Tel: 01977 681 885

Contractor:

Pre-Construct Archaeology Limited
Northern Office
Unit N19a Tursdale Business Park
Durham
DH6 5PG

Tel: 0191 377 1111

CONTENTS

List of Figures and Plates

List of Figures and Plates *(Plates in Appendix C)*

1. NON-TECHNICAL SUMMARY

1.1 An archaeological evaluation was undertaken by Pre-Construct Archaeology Limited at a site on Hawks Road in the Saltmeadows area of Gateshead. The site was the former premises of CPS Haulage Tyneside Limited, located on the north side of Hawks Road at central National Grid Reference NZ 2595 6379. The work, undertaken 19 July-6 August and 6-17 September 2010 as part of the planning process in respect of a proposed re-development of the site, was commissioned by Prospect Archaeology Limited, on behalf of the developers.

1.2 The site is located in an area of archaeological sensitivity, the location of the 18th century New Greenwich area on the South Shore at Gateshead developed by industrialist William Hawks for his successful iron manufactory. In the 19th century, the western portion of Hawks' Iron Works, in the vicinity of the re-development site, was also known simply as Gateshead Iron Works and eventually the overall concern became the successful heavy engineering firm Hawks, Crawshay and Sons. Archaeological remains of Hawks' Iron Works comprise a regionally significant part of the industrial heritage resource for Tyneside.

1.3 The evaluation comprised six trenches and was undertaken in two phases. The first phase comprised the investigation of four trenches (Trenches 1-4) located on a yard forming the eastern part of the site. The second phase comprised the investigation of two trenches (Trenches 5-6) located within a standing building occupying the western part of the site. In broad terms, the evaluation aimed to provide information regarding the character, nature, date and degree of survival of archaeological remains at the site, specifically targeting the locations of significant features and structures depicted on historic mapping.

1.4 Trench 1, located in the south-eastern corner of the yard area, revealed natural river terrace sand and gravel at a depth of *c*. 1.85m below present ground level. At the north-eastern end of the trench, part of an external wall and concrete floor surface were recorded. The wall, built of handmade bricks, was of mid-19th century date, while the surface was probably a later alteration to the building which the wall represented. A number of external deposits and a north-south aligned linear feature at the south-western end of the trench were assigned a mid to late 19th century date. The remainder of the stratigraphy within the trench was of modern date and associated with levelling of the site in the 20th century, ahead of laying down the existing tarmac yard surface.

1.5 Trench 2, located in the southern central portion of the yard area, revealed natural sand and gravel at a minimum depth of *c.* 1.25m below ground level. It was overlain by a developed soil horizon from which medieval pottery was recovered. Above that horizon, deposits associated with intensive occupation of the area in the late 18th and early 19th centuries were recorded. These were cut by the foundations of two structures, probably elements of the same building, dated to *c.* 1860, when Hawks' Iron Works had expanded considerably from its original site. The building remains recorded in the north-eastern part of Trench 2 comprised a subterranean handmade brick structure with substantial brick piers or supports bonded into the internal faces of two of its walls.

1.6 The earliest recorded deposit within the structure in Trench 2 was solidified ash and iron slag, indicating an industrial function for the building, although the precise function was not apparent due to the limited degree to which it was possible to expose the structure in the trench. The structure was mostly filled with ash and cinder, possibly dumped after the building had gone out of use. The structural remains recorded in the south-eastern part of the trench comprised parts of a possible brick flue, although once again not enough of the structure was exposed within the trench to be certain of its function.

1.7 Trench 3, located in the northern central portion of the yard area, reached natural sand and gravel at *c.* 2.30m below ground level. This was overlain by a series of dumped deposits comprising waste materials from various industries, including glassmaking, leather working, rope making and bronze working. These deposits probably do not relate to activity that took place on the site, but more likely indicate that this part of the site was used for landfill in the first half of the 20th century. The dump layers were overlain by make-up deposits for the existing tarmac surface. No deposits of proven archaeological significance were recorded in this trench.

1.8 In Trench 4, located to the east of Trench 2 adjacent to the site boundary, natural sand and gravel was recorded at a depth of *c*. 2.40m below ground level. Once again dumped deposits of 20th century origin directly overlay the natural sub-stratum, although these deposits were more homogeneous than those seen in Trench 3. The dumped material was overlain by make-up deposits associated with the present tarmac surface. Again, no deposits of proven archaeological significance were recorded in this trench.

1.9 In Trench 5, located in the southern central part of the standing building, natural sand and gravel was recorded at a depth of *c*. 2.10m below ground level. A developed soil horizon, very similar to that recorded in Trench 2, overlay the sub-stratum. A silt deposit overlying the soil horizon potentially represented occupation during the early operational phases of the ironworks in the 18th and early 19th centuries. The earliest structural evidence was the remains of an external yard surface formed from crushed iron slag. Post-dating this were two brick pier bases likely representing elements of an open-sided building that appears on the Ordnance Survey 1st edition map. The yard surface probably continued to serve as the floor of this building, which is interpreted as a storage facility. The remainder of the stratigraphy within the trench was of modern date and was associated with levelling of the site in the 20th century ahead of the laying down of the existing concrete floor slab.

1.10 The natural sub-stratum was not recorded in Trench 6, which was located in the central western portion of the standing building. The earliest activity recorded in this trench was a surface, possibly an external yard, above which the remains of a brick-built building were exposed. This was of likely late 19th-century date and associated with a railway line that traversed the site at that time, following closure of the ironworks. To the east of the structure compacted ballast deposits possibly indicated the position of one rail of the railway track. The remainder of the stratigraphy within the trench was of modern date and again was associated with the levelling of the site in the 20th century ahead of the laying down of the existing concrete floor slab.

1.11 In summary, no archaeological features, deposits or structures proven as pre-dating the modern era were encountered in Trenches 3 and 4, located within the much disturbed north-eastern portion of the yard area. In the southern central part of the site, in the area of Trenches 2 and 5, a well-preserved sequence of deposits dating from the medieval period onwards was recorded, including mid-19th century structures associated with Gateshead Iron Works. There was very limited survival of mid-19th century structural remains in Trench 1 in the south-eastern corner of the site, while archaeological remains in Trench 6, the westernmost trench to be investigated, were potentially all of late 19th century date, thus post-dating the closure of the ironworks.

2 INTRODUCTION

2.1 General Background

2.1.1 This report details the methodology and results of an archaeological evaluation undertaken by Pre-Construct Archaeology Limited (PCA) 9 July-6 August and the 6-17 September 2010 on a site on Hawks Road, Gateshead. The area of investigation was the former premises of CPS Haulage Tyneside Limited on the north side of Hawks Road at central National Grid Reference NZ 2595 6379 (Figure 1). The work was commissioned ahead of a proposed re-development scheme by Prospect Archaeology Limited, on behalf of the developers.

2.1.2 The site is a roughly trapezoidal block of land covering *c.* 4,700m^2. It is bounded to the south by Hawks Road, which runs on a WSW-ENE alignment, and to the north by a steep bank overlooking Mill Road, which runs SW-NE, Warehouse facilities lie to the west and industrial units to the east.

2.1.3 Conditional planning permission had been granted for development of the site as a hotel, office block and car parking. The site has particular potential for later post-medieval industrial era archaeological remains since it lies within the 18th century New Greenwich development area on the South Shore at Gateshead chosen by industrialist William Hawks to be the site of his iron manufactory. This potential was established by an archaeological desk-based assessment (DBA) undertaken in 2008.[1] The DBA found that, as part of the original New Greenwich development, the site was occupied by a reservoir or mill pond associated with an early, water-powered phase of the ironworks. In the 19th century, by which time steam had replaced water as the main source of power, the reclaimed land at the site was occupied by a number of buildings associated with the developed ironworks. After the closure in 1889 of what was by then the successful heavy engineering firm Hawks, Crawshay and Sons, little further development of the site took place up to the present day.

2.1.4 A Specification for the evaluation was prepared by the Tyne and Wear Specialist Conservation Team.[2] The Specification followed the format set out by English Heritage in *Management of Research Projects in the Historic Environment*.[3]

2.1.5 The evaluation was undertaken in two phases and comprised the investigation of six archaeological trial trenches. The first phase comprised four trenches (Trenches 1-4) located on a tarmac yard occupying the eastern part of the site, while the second phase comprised two trenches (Trenches 5-6) located within a standing building occupying the western part of the site (Figure 2).

2.1.6 The Site Archive (PCA site code HRG 10) is currently held at the Northern Office of PCA and the retained element, comprising the written, drawn and photographic records, as well as a small assemblage of ceramic material, will be deposited with Tyne and Wear Museums and Archives at Arbeia, South Shields, Tyne and Wear. The Online Access to the Index of Archaeological Investigations (OASIS) reference number for the project is: preconst1-85228.

[1] Under Construction Archaeology 2008.
[2] Tyne and Wear Specialist Conservation Team 2010.
[3] English Heritage 2006.

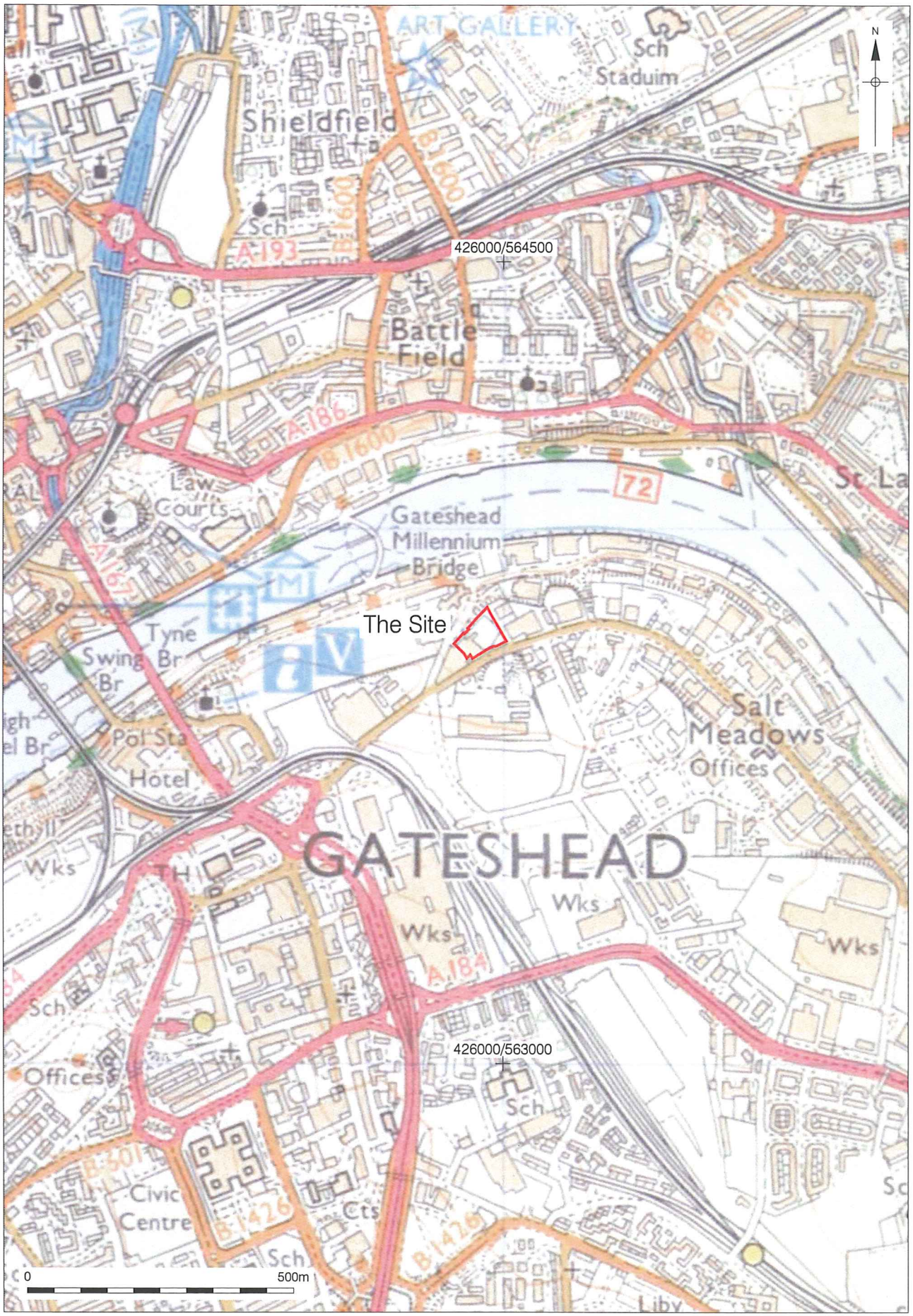


Figure 1
Site Location
1:10,000 at A4

Figure 2
Trench Location Plan
1:800 at A4

2.2 Geology and Topography

2.2.1 The site lies in the valley of the River Tyne, *c.* 200m from the present southern edge of the river. The solid geology of the area is formed by Upper Carboniferous rock of the Pennine Middle Coal Measures formation, comprising interbedded mudstone, siltstone, sandstone and coal seams. The superficial geology of the area is characterised by glaciofluvial deposits including sand and gravel - and Till of Devensian age, associated with the floodplain of the River Tyne.[4]

2.2.2 Located within the Saltmeadows area of Gateshead, east of the town centre, the site lies on the north side of Hawks Road, occupying an almost level platform at *c.* 16.0m OD. At the time of the work herein described, its western portion was occupied by various buildings, the main element being the former warehouse/works building of CPS Haulage, while its eastern portion was a large tarmac yard for vehicular parking, part of the same premises. The yard surface sloped gradually downwards to the south-east, with the extreme south-eastern corner at c. 15.0m OD. Along the northern edge of the site there is a steep overgrown bank falling away to Mill Road, which continues north-eastwards to South Shore Road running along the bank of the Tyne. To the west of the site is a modern warehousing facility, and to the east there are light industrial units, set at a lower level than the yard portion of the site. To the south, the site is bounded by Hawks Road, which also lies at a lower level than the yard. The height difference is most pronounced adjacent to the south-eastern corner of the site.

2.3 Planning Background

2.3.1 Planning permission for re-development of the former CPS Haulage site was granted in 2008 (Gateshead Metropolitan Borough Council planning application reference DC/08/01288/FUL). The applicants were Priority Sites Limited/Starboard Hotels Three LLP/CPS Haulage Tyneside Limited.

2.3.2 The main elements of the re-development scheme comprise construction of a 6-7 storey hotel and a 4-5 storey office block. Associated works are required, such as new vehicular access to Hawks Road and the creation of 67 car parking spaces. The archaeological evaluation was undertaken as a condition of planning permission for the scheme, at the request of the Tyne and Wear Specialist Conservation Team.

2.3.3 Government guidance on archaeology and heritage conservation is now set out in *Planning Policy Statement 5: Planning for the Historic Environment* (PPS5).[5] At a local level, Gateshead Metropolitan Borough Council has policies within its Unitary Development Plan (UDP) concerning archaeology and cultural heritage. Policies of particular relevance are:

> *ENV21 Where archaeological remains survive, whether designated as a scheduled ancient monument or not, there will be a presumption in favour of their preservation in situ. However, where the significance of archaeological remains is such that their preservation in situ is not essential, or is not feasible, a programme of archaeological works aimed at achieving preservation by record will be required, the findings of which should be published.*

[4] Information from the *British Geological Survey* website.
[5] Department for Communities and Local Government 2010.

ENV22 Where there is the likelihood that archaeological remains will be encountered as the result of development, and on all developments over 0.5ha in size, the Council will require a programme of investigative research and/or fieldwork to determine whether the remains, that might exist, merit preservation in situ or by record. Research and fieldwork findings should be published.

2.3.4 Thus UDP policies not only deal with sites, monuments and areas which have scheduled monument status - these being worthy of preservation because of their national significance – but also other important known sites, monuments and areas, as well as sites and areas which have considerable potential archaeological interest.

2.3.5 In sum, therefore, the archaeological evaluation was required, as part of the planning process, to inform Gateshead Metropolitan Borough Council regarding the character, date, extent and degree of survival of archaeological remains, specifically those associated with Gateshead Ironworks, at the site. It was intended that the results would inform a decision by the Tyne and Wear Specialist Conservation Team regarding an appropriate archaeological mitigation strategy ahead of the re-development.

2.4 Archaeological and Historical Background

The archaeological desk-based assessment (DBA) undertaken in 2008 has been used as the basis of the following summary. The research and writing of those responsible is gratefully acknowledged. Other information has been taken from 'Sitelines', the online Tyne and Wear Historic Environment Record (HER) and other online sources. HER reference numbers are not included herein, and the DBA should be consulted for those in the vicinity of the site.

2.4.1 There are no designated heritage assets on the site or in its immediate vicinity.

2.4.2 There is little direct evidence of prehistoric activity in the immediate vicinity of the site. Two bronze swords have been recovered from the River Tyne upstream near the present Tyne bridges and this suggests there were communities in the vicinity during the later prehistoric period.

2.4.3 Gateshead lay at the northern end of the Roman road Watling Street and at the southern end of the Roman crossing of the Tyne (*Pons Aelivs*). Military occupation has not be identified at Gateshead but given the strategic significance of the bridge it seems likely some form of bridgehead would have existed. The position of the Roman and later medieval bridge is well attested and lies *c*. 500m west of the site. Closer to the site, some Romano-British activity was noted during excavations on Oakwellgate ahead of the construction of the (Sage) Regional Music Centre.[6]

2.4.4 Bede records a monastery at Gateshead in the mid-7th century and the modern name of Gateshead may be derived from this. The site of the monastery is unknown but both St. Mary's Church and St. Edmunds Chapel have been suggested as locations. Excavations at the Old Rectory recorded a curvilinear double ditch of pre-Conquest date to the east of Oakwellgate, *c*. 300m west of the site.[7]

[6] Nolan and Vaughan 2002.
[7] *ibid*.

2.4.5 Gateshead is not mentioned in the Domesday Book of 1086, but it was a certainly a manor held by the Bishop of Durham in the post-Conquest era and by 1180 the Boldon Book records watermills, fisheries and a bakehouse in the settlement. Dyeing and shipbuilding are mentioned by the 12th century and during the 13th century a market had been established.

2.4.6 It seems likely that the Bishop of Durham would have encouraged the economic development of Gateshead in direct competition with Newcastle and one source considers the town to have been a borough by 1153.[8] However, the medieval town lay to the west of the site, along Oakwellgate and Pipewellgate, and the eastern part of the manor was reserved as a park for the Bishop's uses, including hunting for sport, farming of game, possibly fisheries on the streams and Tyne, growing timber and the rental of rights of pannage and grazing.

2.4.7 Towards the end of the medieval period, the Bishop's Park was increasingly subdivided for agricultural purposes and during the 15th century coal extraction began within the parkland, with the coal transported to 'staiths' (elevated staging on a wharf) on the River Tyne for export. The later Dock Staith was located on the riverside to the north of the site at New Woolwich and, like the Bishop's Staith (or Rock Staith), may have been of late medieval origin. Waggonways, and by the 19th century railways, feeding these staiths could have crossed the site and during the 19th century tramways are depicted at Gateshead Iron Works, running from the Gateshead Tyne Main Colliery, parallel to Mill Road.

2.4.8 From the late 16th century to late 17th century, the manor of Gateshead rested with the burgesses of Newcastle and it is thought that Newcastle saw advantage in limiting Gateshead's expansion during this period. But with the manor's return to the Bishops of Durham and their tenants, growth appears to have accelerated rapidly.

2.4.9 While the excavation and export of coal was the most important early post-medieval industry in Gateshead, other industries are also recorded and these developed rapidly during the late 17th and 18th centuries in the area of the Bishop's Park known as the 'Salt Meadow'; the name, indicative of salt-making, obviously gave rise to the modern name, Saltmeadows, of this part of the town. These other industries included ship building, rope making and pottery and brick manufacture.

2.4.10 Evidence of the mining industry's links to maritime trade are evidenced by the large mound of ballast to the south of the site as recorded on maps from the early 19th century; ballast was off-loaded from empty colliers returning from the ports and cities of southern England.

2.4.11 William Hawks I (d. 1755) exploited a small part of this maritime trade and established his successful ironworks in the New Greenwich development area on the South Shore at Gateshead in 1748. Hawks had been previously employed by the Winlaton based iron manufactory Crowley's. Although an experienced blacksmith, Hawks also appears to have held a more managerial role in Crowley's London warehouse at Greenwich on the Thames.

[8] Beresford and Finberg 1974.

2.4.12 Hawks' early works on the South Shore at Gateshead comprised a few "blacksmiths' shops at New Greenwich",[9] this being the development area he chose for the site of his iron manufactory. Hawks exploited his contacts to secure a supply of scrap iron from London and this connection may have been the main reason for locating his works on the Tyne. Positioned between two staiths (Rock and Dock) there would have been a steady traffic in colliers keen to carry a paying return cargo of scrap iron from London.[10] The use of recycled material would have reduced Hawks' start up costs and possibly allowed the production of superior wrought iron and steel products. Maritime links may also have permitted the import of bar iron from Russian or Baltic sources for the production of cementation steel.

2.4.13 By 1772, the company was importing slit rods, probably manufactured in Shropshire or Wales, from London, demonstrating that the importance of the trade connection with the capital continued for some time.[11] The ready supply of coal, from which coke could be made, would also have added to the attraction of a site by the Tyne. However, it is likely that at such an early date Hawks remained reliant on charcoal to smith wrought iron via the finery/chafery process, until the introduction of the puddling furnace after 1784. At this time Hawks' works manufactured a variety of ironmongery, including shovels and spades. In a later document the Historical Publishing Company stated that, in the earliest works, the anchor smith's bellows were worked by horsepower.[12]

2.4.14 The available evidence suggests that the core of Hawks' works at New Greenwich lay north and east of the site, above the Tyne shore; archaeological fieldwork in this area has recovered significant remains of these facilities.[13]

2.4.15 William Hawks II (d. 1810) is credited with a significant expansion of the ironworks, which can be traced through later 18th and early 19th century documents and cartographic sources. New premises were developed at 'New Deptford' and 'New Woolwich', in keeping with the naming of the original works. A document records that, by 1772, a watercourse was employed to power Hawks' works. Hutton and Charles' Plan of Newcastle upon Tyne and Gateshead of 1774 shows a watercourse running north-eastwards from the north-western corner of the site, in the area of the modern Mill Road. A lease of 1795 states that a "*dam and reservoir had recently*" been constructed as an "*added convenience to the forge, mill and mill race*". Hutton and Charles show what is likely to be this reservoir/mill pond as a large 'comma' shaped feature occupying much of the site and crossed about its middle by a bridge or track. The shape of the feature, with a wide fore-dam to the north and narrow tail to the south, effectively confirms that the powered workings were located below the site, on South Shore. A ravine, possibly the stream or tailrace, was located during the aforementioned archaeological work on the former Kelvin Works site, a manufactory which had gone out of use by the 1850s.[14]

[9] Historical Publishing Company 1889.
[10] Read no date.
[11] Bell 1863.
[12] Historical Publishing Company *op. cit.*
[13] Parker 2006 and 2007.
[14] Parker 2006.

2.4.16 William Hawks' expansion relied heavily on contemporary technical advances in iron and wrought iron production and ultimately success was signaled by the company's appointment to supply chains, anchors, ordnance and 'hardware' to the government. The buoyant war economy resulting from the country's campaigns against Napoleon can only have assisted the introduction of new technology, providing a constant demand for weapons. Astute sourcing of raw materials (Scottish pig iron was used in the early 19th century, and Welsh bar iron was imported for finishing after the establishment of the rolling mills before 1830),[15] and the plentiful local supplies of coal and coke would have kept the company profitable during this period.

2.4.17 The first steam engine (by Boulton and Watt) was installed at Hawks' works during 1790. Two more followed in quick succession and initially the motive force was put to work in boring, drilling, grinding, rolling and screwing.[16] It seems likely that blowing engines would also have been introduced to increase the efficiency of puddling furnaces and reheating furnaces in the rolling mills, foundry and forge. Hawks' works continued to innovate and lead their local and national competitors with a chain testing house by 1812 and the commissioning of Nasmyth's Patent Steam Hammers by the mid-19th century.

2.4.18 Oliver's Plan of Newcastle-upon-Tyne and the Borough of Gateshead shows that possibly only a small remnant of the reservoir/mill pond survived in 1833. A plan and lease of the late 1830s does not show any of the feature and it is likely to have been infilled or covered over by then. This plan show the site largely unoccupied, set in the angle of two branches of 'Occupation Road' (now Hawks Road and Mill Road). The main foundry building of 'Hawks and Co.'s Manufactory' lay to the immediate east of the site, with its western end just extending onto the site, while a small block of cottages stood on the southern road frontage. The main forge building of Hawks' works lay just beyond the northernmost point of the site.

2.4.19 The Ordnance Survey 1st edition map shows the site lay within a relatively undeveloped area of the overall ironworks complex above the South Shore, specifically taking in part of an open yard bisected by a railway (or tramway) that connected with a main line to the south. The main track of this railway/tramway ran north-eastwards to riverside facilities, such as the rolling mills, on South Shore, while various spurs served, for example, the forge and foundry buildings of 'Gateshead Iron Works', as the works in the vicinity of the site are annotated on the map. It seems likely that raw materials, work pieces and finished goods were being delivered, moved around the complex and dispatched by rail. This map indicates that there were considerable height differences between the various divisions of the works. Of note are areas of terracing indicated by hachures, suggesting the position of the earlier reservoir/mill pond, also the railway entered the site on an embankment and a spur left on a viaduct.

[15] Harrison 1979.
[16] Historical Publishing Company *op. cit.*

2.4.20 Whilst there is no firm evidence to suggest that the railway/tramway running through the site supplied a coal staith, it is documented that a waggonway ran to the west of the site until at least 1899, this serving a staith/coal drop (Rock or Dock Staith). The large 'Ballast Hill' depicted on 19th and 20th century maps immediately to the south of the site also suggests links with the coastal trade, although its appearance on mapping at the same time as Tyne Main Colliery, which lay on higher ground further south, could suggest that it was a spoil heap associated with that working, rather than a ballast hill *per se*.

2.4.21 By the mid-19th century Hawks' company had amalgamated with the business of former competitor George Crawshay to form Hawks, Crawshay and Sons, which became a very successful heavy engineering company. It specialised in bridges (most famously supplying the ironwork for Stephenson's High Level Bridge over the Tyne), as well as iron and steel for the shipbuilding industry, piles and ironwork for lighthouses and piers and steam engines for land and maritime use.

2.4.22 It is interesting to note that Stephenson demanded that Hawks provide sample of materials for testing while designing the High Level Bridge. This shows an awareness of materials and scientific methods unusual for the day.[17] The plant at the works in the later part of the 19th century included 33 puddling furnaces in 1863.[18] In less than 10 years (by 1871) the number of puddling furnaces had more than doubled in period that marked a high point both for the company and for the wrought iron industry in the north of England as a whole.[19]

2.4.23 It is generally believed that Hawks, Crawshay and Sons went into liquidation suddenly in 1889, and that a failure to specialise, compared to their competitors, forced the closure.[20] However, economic factors that were affecting the entire malleable iron industry at this time likely also contributed to this decline.

2.4.24 The site remained vacant for much of the early 20th century. Some indication of the company's lingering influence is apparent in street names such as Hawks Road, Mill Road, Nailor's [sic] Bank, and other facilities, such as the Patent Hammer Inn, the Vulcan Tavern and the New Deptford Inn.

[17] Bailey 2003.
[18] Bell 1864, quoted in Harrison *op. cit.*
[19] Griffiths 1873, quoted in Harrison *op. cit.*
[20] Atkinson 1974.

3. PROJECT AIMS AND RESEARCH OBJECTIVES

3.1 Project Aims

3.1.1 The project is threat-led with potential to disturb or destroy important sub-surface archaeological remains of the 18th and 19th century industrial era in particular. Therefore, the broad aim of the project was to inform all project stakeholders, including the LPA, regarding the character, date, extent and degree of survival of archaeological deposits within the re-development site.

3.1.2 Archaeological trial trenching was chosen as the investigative tool to test the archaeological potential of the re-development site, with six trenches (Trenches 1-6) excavated in two phases of evaluation fieldwork. Trenches 1-4 were investigated in the first phase, all four sited in the open yard comprising the eastern portion of the site. This area had been occupied in the 18th century by part of a large curving reservoir or mill pond associated with Hawks' Iron Works at New Greenwich and, following land reclamation, was subsequently occupied by various buildings as the works developed along the riverside in the 19th century.

3.1.3 Trenches 5 and 6 were investigated in the second phase, both sited within the standing warehouse/works building occupying the western portion of the site. This area was occupied by the remainder of the ironworks' reservoir/mill pond in the 18th century, and subsequently by buildings of the developed works and a railway/tramway running north-eastwards to the riverside.

3.1.4 Additional aims of the project were:

- to compile a Site Archive consisting of all site and project documentary and photographic records, as well as all artefactual and paleoenvironmental material recovered.
- to compile a report that contains an assessment of the nature and significance of all data categories, stratigraphic, artefactual, *etc.*

3.2 Research Objectives

3.2.1 The project was considered to have good potential to make a significant contribution to existing archaeological knowledge of east Gateshead in general and of the 18th to 19th century industrial heritage of the area in particular.

3.2.2 Specific research objectives to be addressed by the project were formulated with reference to the existing archaeological research framework for the North East: *Shared Visions: The North-East Regional Research Framework for the Historic Environment* (NERRF),[21] which highlights the importance of research as a vital element of development-led archaeological work.

3.2.3 The NERRF lists the following key priority within the research agenda for the post-medieval period which is of direct relevance to the project: 'PMii – Industrialisation', which observes:

[21] Petts and Gerrard 2006.

"*Compared with the coal and lead industries, relatively little work has been undertaken on the region's important iron and steel industry. Further work on early (18th-century or earlier) industrial technology is a priority….The development of urban foundries in the 18th century, and forges, rolling mills and engineering works in the later 18th and 19th centuries is also of considerable interest. Linsley (2002, 210) notes the requirement for further research into the region's iron and steel industries, including….the larger-scale integrated iron and steel works of the 19th century.*

3.2.4 Therefore, given the location of the site, specific research objectives to be addressed by the project were:

- Can any sub-surface archaeological remains in the areas of investigation provide evidence for the position of the 18th-century mill pond and associated dams and sluices?
- Can any sub-surface archaeological remains in the areas of investigation provide evidence for the date and function of the 19th-century ironworks' buildings?

4. ARCHAEOLOGICAL METHODOLOGY

4.1 Fieldwork

4.1.1 The evaluation fieldwork was undertaken in two phases, 19 July-6 August and 6-17 September 2010. All fieldwork was undertaken in accordance with the relevant standard and guidance document of the Institute for Archaeologists (IfA).[22] PCA is an IfA-Registered Organisation. The first phase of the evaluation was undertaken according to the Specification complied by Tyne and Wear Specialist Conservation Team, which should be consulted for full details of methodologies employed regarding archaeological excavation, recording and sampling. A Project Design for the second phase of the evaluation was compiled by PCA.[23]

4.1.2 In total, six trial trenches were investigated, four in the first phase of work, these located on the tarmac yard occupying the eastern part of the site, the other two in the second phase of work, these within the standing warehouse/works building of CPS Haulage occupying the western part of the site (Figure 2).

4.1.3 The alignments and maximum dimensions of the trenches at ground level were:

- Trench 1: 18.30 NE-SW x 4.20m wide
- Trench 2: L-shaped; 11.30m NE-SW with 7.80m NW-SE return x 4.40m wide
- Trench 3: 17.70m NE-SW x 4.25m wide
- Trench 4: 20.40m NW-SE x 4.85m wide
- Trench 5: 9.60m NE-SW x 3.80m wide
- Trench 6: 9.50m east-west x 1.90m wide

4.1.4 Trenches were excavated to a maximum depth of *c.* 2.40m below existing ground level, or the clearly defined top of the natural sub-stratum, whichever was reached first. All trenches were hand cleaned and then photographed and archaeologically recorded.

4.1.5 Two Temporary Bench Marks were established on the site using existing survey data. The TBMs had values of 18.09m OD and 17.21m OD. The heights of all principal strata and features were calculated relative to Ordnance Datum and indicated on the appropriate plans and sections.

4.2 Post-excavation

4.2.1 The stratigraphic data generated by the project is represented by the written, drawn and photographic records. A total of 248 archaeological contexts were defined in the six trenches (Appendix B). Post-excavation work involved checking and collating site records, grouping contexts and phasing the stratigraphic data (Appendix A). A written summary of the archaeological sequence was then compiled, as described below in Section 5.

[22] IfA 2008a.
[23] PCA 2010.

4.2.2 The artefactual material from the evaluation comprised a small assemblage of pottery, glass, clay tobacco pipe and ceramic building material. Specialist examination of the material was undertaken and the results are given in Appendix D. No other categories of inorganic artefactual material were represented.

4.2.3 The palaeoenvironmental sampling strategy of the project was to recover bulk samples where appropriate, from well-dated (where possible), stratified deposits covering the main periods or phases of occupation and the range of feature types represented, with specific reference to the objectives of the evaluation. To this end, no appropriate deposits were encountered and therefore no bulk samples were recovered. No other biological material was recovered.

4.2.4 None of the material recovered during the evaluation required specialist stabilisation or an assessment of its potential for conservation research.

4.2.5 The complete Site Archive, in this case comprising only the written, drawn and photographic records (including all material generated electronically during post-excavation) will be packaged for long term curation. The artefactual material is not recommended for retention as part of the Site Archive due to its low significance. In preparing the Site Archive for deposition, all relevant standards and guidelines documents referenced in the Archaeological Archives Forum guidelines document[24] will be adhered to, in particular a well-established United Kingdom Institute for Conservation (UKIC) document[25] and the relevant standard and guidance document of the IfA.[26] No material was recovered that required specialist stabilisation or an assessment of potential for conservation research.

4.2.6 The depositional requirements of the body to which the Site Archive will be ultimately transferred will be met in full. At the time of writing this will be Tyne and Wear Museums and Archives at Arbeia, South Shields.

[24] Brown 2007.
[25] Walker, UKIC 1990.
[26] IfA 2008b.

5. RESULTS: THE ARCHAEOLOGICAL SEQUENCE

During the evaluation, separate stratigraphic entities were assigned unique and individual 'context' numbers, which are indicated in the following text as, for example [123]. The archaeological sequence is described by placing stratigraphic sequences within broad phases, assigned on a site-wide basis in this case. An attempt has been made to add interpretation to the data, and correlate these phases with recognised historical and geological periods.

5.1 Phase 1: Natural Sub-stratum

5.1.1 Phase 1 represents natural geological material, exposed within the bases of Trenches 1-5. The natural sub-stratum was not reached in Trench 6.

5.1.2 The natural sub-stratum in Trenches 1-5 comprised compact, light brownish yellow sand and gravel. This was recorded as layers [115] (Trench 1, Figure 3; Section 1, Figure 5; Plate 1); [250] (Trench 2, Figure 4; Section 4, Figure 6; Plate 4); [331] (Trench 3, Figure 3; Plate 9); [410] (Trench 4, Figure 3; Section 6, Figure 7; Plate 10); and [524] (Trench 5, Figure 8; Section 7, Figure 9; Plate 11). The sand was medium to coarse grained, and the gravel ranged from fine to coarse. Sandstone cobbles up to *c*. 0.25m diameter were noted throughout.

5.1.3 The height at which this natural sand and gravel was encountered varied across the site. The highest value recorded was in Trench 2, where layer [250] had a maximum height of 16.35m OD, at a depth of *c.* 1.25m below existing ground level. Its height was more consistent in Trenches 1, 3, 4, and 5, where it was recorded at 15.37m OD, 15.31m OD, 15.45m OD and 15.18m OD, respectively. Minimum depths below current ground level were 1.83m in Trench 1, 1.23m in Trench 2, 2.30m in Trench 3, 2.42m in Trench 4 and 2.09m in Trench 5. The survival of the material at a greater height in Trench 2 is likely due to lesser horizontal truncation by later activity in the part of the site that Trench 2 was located, an interpretation substantiated by the better survival of archaeological deposits generally in that area.

5.2 Phase 2: Medieval and Post-medieval

5.2.1 Phase 2 represents activity attributed to the medieval and early post-medieval periods, prior to later post-medieval industrial era use of the site. The earliest evidence of human activity recorded during the evaluation is of medieval date, probably representing agricultural use of the area. This activity is likely to have continued into the post-medieval period, until the development of site in the later post-medieval industrial era.

5.2.2 The earliest archaeological deposit recorded at the site was encountered in Trench 2, immediately overlying natural sand and gravel. It comprised a layer, [215], of soft, mid greyish brown sandy silt (Figure 4; Sections 2 and 4, Figure 6; Plates 3 and 4). Up to 0.30m thick, it survived throughout Trench 2, where not truncated by later features, and was recorded at a maximum height of 16.60m OD. The layer is interpreted as a developed agricultural soil horizon and it produced pottery of medieval and early post-medieval date.

5.2.3 The earliest pottery recovered from layer [215] comprised five sherds of medieval pottery, broadly datable to the 13th/14th centuries (see Appendix D). It also yielded two sherds of early post-medieval pottery dating to the 16th/17th century, and five sherds of 17th-century redware. A fragment of clay tobacco pipe stem was also recovered, the large bore of which was consistent with a 17th-century date. The recovered finds suggest that the layer is a developed soil of medieval or earlier origin, reworked by agricultural activity over several centuries.

5.2.4 In Trench 5, a similar layer, [523], of soft, mid yellowish brown silt was recorded immediately above the natural sub-stratum (Section 7, Figure 9). This layer, which had a maximum thickness of 0.27m, was recorded in section only, at a maximum height of 15.43m OD. The similarity in composition to the horizon recorded in Trench 2, and the position of the layer in the stratigraphic sequence, suggest that it should be assigned to this phase. No finds were recovered from layer [523].

5.2.5 A number of features interpreted as possible postholes were recorded cutting through the aforementioned soil horizon in Trench 2 (Figure 4). Three of these – postholes [256], [258] and [260] - were in a group in the south-westernmost part of the trench. Of this group, only one, sub-circular posthole [256], which measured 0.33m in diameter, had any real depth, at 0.21m. The other features in this group were also sub-circular in plan, but were only 30mm (posthole [258]) and 90mm (posthole [260]) deep, and thus may represent posthole bases. The three features in the group were filled with brownish grey sandy silt, [255], [257] and [259], respectively. Fill [259] of posthole [260] contained fragments of decayed timber, possibly representing the remains of a post. Two features were located *c.* 4.20m to the north; one a relatively deep (0.20m) sub-circular feature, [270], the other a shallow (50mm) sub-circular feature, [272]. The fill, [273], of feature [272] produced a single sherd of abraded 14th-century pottery, although this could have been residual in context. It is possible that the features represent the truncated remains of postholes cut from a higher level, and may belong to a later phase, perhaps representing part of a fence line associated later post-medieval industrial era activity (Phase 3).

5.3 Phase 3: 18th - 19th Century

5.3.1 Phase 3 represents later post-medieval industrial activity at the site, likely post-dating the mid 18th century foundation of Hawks' Iron Works and preceding the construction of buildings recorded in Trenches 2 and 5 that are datable to *c*. 1860.

5.3.2 Overlying soil horizon [215] in Trench 2 was a layer, [214], of brownish grey sandy silt with frequent flecks of degraded limestone throughout (Sections 2-4, Figure 6; Plate 3). Up to 0.32m thick, it was recorded at a maximum height of 16.89m OD. The layer produced six sherds of pottery and two clay tobacco pipe stems. The earliest potsherd came from the rim of a jar in an oxidised fabric, broadly dated to the 13th/14th century, and assumed to be residual in context. The latest pottery recovered consisted of three sherds of creamware dating to the 18th or early 19th century. The lime flecks within the deposit could represent the use of lime fertiliser, so the deposit is interpreted as a probable garden soil, possibly associated with the occupation of the site when the ironworks was established in 1748. The lack of inclusions deriving from industrial activity suggests that processing of iron did not take place in the immediate vicinity of the trench.

5.3.3 A deposit, [252], recorded in the south-west facing section of the south-eastern branch of Trench 2, was interpreted as being equivalent to layer [214] (Section 3, Figure 6). It comprised soft, dark brownish grey sandy silt with charcoal and limestone flecks, and was up to 0.40m thick, recorded at a maximum height of 16.70m OD.

5.3.4 Layer [252] was probably contemporary with, or possibly equivalent to, a 0.27m thick layer, [246], of generally similar material, but lacking the lime flecks, recorded in the north-east facing section of Trench 2 (not illustrated herein). This deposit produced two fragments of clay tobacco pipe, a bowl and part of a stem. The bowl dates to *c*. 1680-1710, suggesting that this accumulation pre-dated the foundation of the ironworks. Two deposits above layer [246] are probably also broadly contemporary. These comprised a lens, [245], of coal fines mixed with dark grey sandy silt, up to 50mm thick, and a 0.21m thick deposit, [244], of dark grey sandy silt very similar to layer [246].

5.3.5 A layer, [213], of dark grey silty sand, with occasional fragments of ceramic building material, overlying soil horizon [214] was probably associated with the intensified occupation of the area associated with the mid-18th century establishment of the ironworks (Sections 2 and 3, Figure 6). Two further deposits, [280] and [231], pre-dated the construction of a structure, Structure [217], as described below in Phase 4. The earlier of these, layer [280], comprised a 0.10m thick layer of black coal fines and silt (Section 4, Figure 6). The overlying layer, [231], comprised very compact ash and iron slag, up to 0.28m thick (Sections 3 and 4, Figure 6). This deposit was evidently associated with processing of iron in the area, but was cut by the construction cut for Structure [217].

5.3.6 In Trench 5, soil horizon [523] was overlain by a deposit, [522], of firm, dark grey sandy silt mixed with coal fines (Section 7, Figure 9). This layer was up to 0.21m thick, and is interpreted as representing a build-up of occupation material associated with the 18th/early 19th-century ironworks. Overlying this deposit was a very compact 0.10m thick layer, [521]=[519], comprising crushed and fragmented iron slag in a silty sand matrix (Figure 8; Section 7, Figure 9; Plate 11). It was recorded at a maximum height of 15.70m OD, with its upper surface sloping away gently from north-east to south-west. The layer is interpreted as a yard surface associated with an early phase of the use of the ironworks, and it is likely to have also served as the floor of a Phase 4 structure, as detailed below. The surface was overlain by a deposit, [520], of loose mixed ash and clinker, up to 0.23m thick.

5.4 Phase 4: Mid to Late 19th-Century

5.4.1 Phase 4 represents development of the site in the mid to late 19th century and relates to a group of structures depicted on the Ordnance Survey 1st edition map, dated 1862, as part of Gateshead Iron Works. Structural remains of this phase were identified in Trenches 1, 2 and 5. While the specific functions of the buildings are not indicated on the map, they lie in an area served by a railway line running north-eastwards towards the river to the core elements of the ironworks, and an industrial purpose can reasonably be inferred.

5.4.2 At the north-eastern end of Trench 1, the natural sub-stratum was cut by a 0.45m deep linear construction trench, [108], aligned NW-SE, with steep sides breaking sharply to a flat base (Section 1, Figure 5). This represents the construction trench for a brick wall, [105], running across Trench 1 (Figure 3; Plate 2). This had a maximum width of 0.48m and stood to a maximum height of six courses (0.52m). It was constructed from handmade common bricks (230mm x 115mm x 70mm, although with some variation in the dimensions), laid in 3:1 English Garden Wall bond. At the south-eastern end of the exposed portion of the wall there were two additional courses of brickwork at the base, comprising a bottom course of headers below a course of stretchers. The top of the wall, as exposed during the evaluation, was 0.23m (one brick) wide. The third course down from the top of the wall was offset by 0.12m on the north-eastern side, to give a width of 0.35m. The two courses below this were further offset 0.13m. Overlying the upper offset course was a 95mm thick concrete slab, [116], representing an internal floor surface, recorded at a maximum height of 15.37m OD (Figure 3; Plate 2). To the south-east, the surface had a straight edge, abutted by a 0.19m thick deposit, [103], of loose crushed mortar, possibly representing the position of a 'robbed-out' return of wall [105].

5.4.3 Below concrete surface [116], and abutting the north-eastern face of the wall foundation, was a layer, [104], of ash and cinder, greater than 0.23m thick (Section 1, Figure 5). This deposit may represent a make-up for the floor surface, or an internal deposit within the building pre-dating the laying of the concrete floor, which is likely to be a later alteration to the building, rather than part of the primary phase of construction.

5.4.4 On the south-western side of the wall, construction trench [108] was backfilled with a loose deposit, [107], of silty sand with frequent large angular fragments of brick and crushed mortar throughout (Section 1, Figure 5). The backfill was overlain by a 0.20m thick deposit, [106], of black silty sand and coal fines, which extended along the length of the trench and probably represents an external accumulated deposit associated with the use of the building.

5.4.5 At the south-western end of Trench 1, a number of deposits recorded in section have been assigned to Phase 4 (Figure 5). Overlying occupation deposit [106] at the south-western end of the trench was a layer, [109], of firm, mid greenish grey clayey silt with frequent sandstone and mudstone inclusions. This had a maximum thickness of 0.33m, and was overlain by a 0.21m thick layer, [114], of firm, dark grey sandy silt with occasional ash lenses. These two deposits were interpreted as external accumulations of material associated with the use of later 19th-century buildings in the south-eastern corner of the site.

5.4.6 The aforementioned deposits were cut by a linear feature, [113], aligned roughly north-south across the width of Trench 1, which had a maximum width of 1.47m, and was 0.72m deep (Figures 3 and 5). Its primary fill, [112], comprised firm, light brownish yellow silty clay, up to 0.28m thick, recorded on the north-eastern side of the feature. This was overlain by a main fill, [111], of loose black sandy silt and ash, with occasional brick and stone fragments. Six sherds of pottery were recovered from this deposit, none of which post-dated the early 19th century. The deposit had a maximum thickness of 0.69m, and was overlain by a thin (55mm) deposit, [110], of compact, mid yellowish brown sand and gravel, which represented the latest fill of the feature.

5.4.7 In the NE-SW aligned portion of Trench 2, the latest Phase 3 deposit, [231], was cut by a vertical-sided construction trench, [279], for the aforementioned structure, [217], which had a substantial subterranean element (Figure 4; Section 4, Figure 6; Plates 5 and 7). The construction trench had a maximum width of 0.30m, measured from the external faces of the walls of the structure. The base of the cut was not reached during the evaluation. The lowest recorded fill, [278], of the construction cut comprised sandy clay and coal fines, over 0.12m thick. Above this was a 0.65m thick deposit, [277], comprising large pieces of solidified slag in an ash and clinker matrix. The uppermost fill, [276], of the construction trench consisted of a 0.37m thick sand and ash deposit, containing frequent fragments of handmade brick.

5.4.8 Structure [217], as exposed within the trench, comprised a rectangular structure represented by three external brick walls with two internal brick piers. The external dimensions of the structure as exposed were 4.46m NE-SW x 1.80m NW-SE with a maximum exposed height of *c*. 2.20m. The north-eastern wall, [218], of Structure [217] was over 1.60m in length, and continued into the north-west facing section of the trench. The width of the wall was 0.38m (one and a half bricks), and it stood to a height of more than 1.83m (20 courses). The wall was built from handmade common bricks (210mm x 100mm x 70mm, although with some variation in the dimensions). The bonding material was hard, brittle light greyish white lime mortar. The bricks were laid in 3:1 English Garden Wall bond, although it was notable that in the internal face the ninth visible course from the base of the excavation comprised a course of edge-set stretchers. At 0.70m from the northern corner of the structure, there was a 0.13m wide cavity within the centre of the wall, containing a wrought iron or steel bar, circular in cross-section, with a diameter of 20mm. A 0.10m^2 plate was welded to the base of the rod, which was *c*. 1m in length. The base of the cavity was above the tenth visible brickwork course from the lowermost limit of excavation, at a height of 16.12m OD. At the base of the cavity there was a gap in the brickwork of the internal face of the wall 0.11m (half a brick) wide and 0.18m (2 courses) high. Although the base plate of the rod was resting on the base of the cavity, evidence from elsewhere within the structure indicated that, in its original position, it would have been level with the top of the gap in the internal brickwork, at a height of 16.30m OD. Another rod is likely to have been positioned *c*. 0.48m from the corner of the structure, in the centre of the wall. The function of the rods may simply have been to reinforce the walls, although it seems more likely that they formed the support/anchoring mechanism for an engine or other machinery.

5.4.9 The north-western wall, [219], of Structure [217] was bonded into wall [218] and the south-western wall, [220], and was of similar construction in terms of materials and bonding. The wall measured 4.46m NE-SW, and was 0.36m wide. At a distance of 0.12m from the internal corner with wall [220] there was a cavity in the brickwork measuring 0.25m by 0.24m. The cavity was filled with solidified iron slag, and represents the base for a metal rod such as those recorded in the north-eastern and south-western walls of the structure. It is likely that another such cavity would have existed in a similar position at the north-eastern end of the wall. Although predominantly built from handmade common brick of a dark red fabric, the wall included a chimney header refractory brick, stamped ‘LINTZ’, which appeared to belong to the primary phase of construction.

5.4.10 The stamp indicates that the brick was manufactured at the Lintz Colliery, near Burnopfield in County Durham. The colliery was won in 1855, and was producing fireclay from 1863 at the latest. Documentary evidence, however, suggests that brick kilns were not in operation there until 1868,[27] which establishes a *terminus post quem* for the construction of the building. As the structure is interpreted as part of one of the buildings depicted on the Ordnance Survey 1st edition map (1862), this date suggests that the brick structure was a later addition to the building, rather than part of the primary phase of construction.

5.4.11 The south-western wall, [220], of Structure [217] was of similar construction to the other walls of the structure. This was 0.37m wide and over 1.78m in height. At a distance of 0.12m from the internal corner with north-western wall [219] there was a cavity within the brickwork measuring 0.23m by 0.18m, filled with solidified slag and representing the base of a metal reinforcing rod. At a distance of 1.06m from the internal corner there was another cavity in the centre of the wall, with the iron/steel rod, [282], still *in situ* (Section 4, Figure 6; Plate 8). At the base of the cavity there was a gap in the internal face of the wall measuring 0.13m in width and 0.21m in height. This gap and the bottom part of the central cavity were filled with solidified iron slag, on top of which the base plate of the rod lay, at a height of 16.28m OD. The rod was of circular cross-section and 20mm in diameter. 0.31m of the rod was visible in section, above which the cavity was again filled with solidified slag, [275], around the bar, which continued to the maximum height (17.27m OD) to which the wall survived. Slag deposits in all of the wall cavities associated with the metal fixing rods were assigned the same context number, [275].

5.4.12 Bonded into the internal (south-western) face of north-eastern wall [218] of Structure [217] was a brick pier, [221], of which only the north-western face was exposed, in section. The north-western face of the pier was 1.30m from the internal corner of the structure, and measured 0.83m NE-SW. A corresponding pier, [226], was bonded into the north-eastern face of the south-western wall [220], also 1.30m from the internal corner, and measuring 0.89m NE-SW. Both of these elements were evidently contemporary with the external walls, being of similar construction with regard to materials and bonding. Both piers had gaps in the brickwork, measuring 0.14m-0.16m in width and 0.18m in height, at the bases of internal cavities containing metal rods corresponding to those in the external walls. The gap in the north-western face of north-eastern pier [221] was 0.13m from the internal face of wall [218], and was blocked with a piece of timber, [274], measuring 0.21m x 0.15m x 0.10m. That in the face of the south-western pier [226] was also 0.13m from the face of wall [220], and was filled with slag, [275]. The height of the tops of these openings was *c.* 16.30m OD.

5.4.13 In the south-eastern branch of Trench 2, Phase 3 deposit [246], recorded in the north-east facing section, was cut by the construction trench, [238], for a brick wall, [225] (Figure 4; Plate 6). The construction trench had a near vertical side to the north-west and a flat base. It was backfilled with a loose black sandy silt deposit, [237], with frequent mortar fragments. A single, possibly residual, sherd of 18th to 19th-century redware was recovered from this fill. Wall [225] was built of handmade brick (240mm x 120mm x 80mm, although with some variations). The bricks were laid in a random bond, which included many partial bricks, and were bonded with a moderately hard, light yellowish grey lime mortar.

[27] Davison 1986.

5.4.14 At its north-eastern end there was a dog-leg in wall [225], the north-easternmost 0.30m of which was 0.10m further south-east than the main part of the wall, which ran 0.60m to the south-west, continuing beyond the limit of excavation. A brick sample taken from wall [225] comprised a fragment of firebrick with a pale yellow fabric. One side of the brick was stamped 'COW[…]'; the full stamp is likely to have been 'COWEN,' indicating that the brick was manufactured at the Blaydon Burn brickworks of Joseph Cowen. This is of limited value in terms of dating the structure, as the works was founded in the 18th century and remained in production until the 20th century.

5.4.15 The north-eastern end of wall [225] was abutted by the remains of the north-western end of a timber beam, [228], the original dimensions of which were *c*. 1m in length and 0.16m^2. The south-eastern end of the beam was tied into the base of a NE-SW aligned wall, [222], which was again built from hand-pressed bricks, predominantly firebricks, laid in 3:1 English Garden Wall bond, and bonded with very similar lime mortar to the other walls of the structure. A single brick was sampled from this wall. The firebrick was stamped 'POTTE[…]', indicating that it was manufactured at the Tyneside brickworks of Addison Potter, active between *c*. 1847 and the late 1880s.[28] The wall [222] was traced for a distance of 2.86m, continuing beyond the limit of the trench to the south-west. It was 0.23m (one brick) wide, and survived to a maximum height of 0.32m. Its north-eastern end abutted another timber sleeper beam, [227], again of 0.16m^2 square section, and 1m in length. The beam was also abutted, to the north-west, by the north-eastern end of another NE-SW aligned brick wall, [223]. A separate piece of timber, *c*. 40mm thick, was bolted onto the south-west face of the beam, between the two walls. North-western wall [223] was of largely identical construction to the other walls of the structure, and was 1.50m in length (NE-SW), although the south-western end was disturbed, suggesting that the wall may have been truncated at this end. The north-eastern end of wall [223] appeared to dog-leg around the north-western end of timber beam [227], although there was certainly disturbance in this area. It is possible that the brickwork recorded as the north-eastern end of wall [223] actually represents a different wall, although potentially still part of the same structure. The south-eastern end of beam [227] was tied into the stub of another NE-SW aligned brick wall, [224], which continued beyond the limit of excavation to the north-east. The wall, which was built within a near vertical-sided construction cut, [253], was of largely identical construction to the other walls of the structure and measured 0.31m NE-SW, 0.32m in width and over 0.70m (9 courses) in height.

5.4.16 Taken together, walls [222], [223], [224], [225] and beams [227], [228], as described above, formed a structure, [236], over 4.30m in length (NE-SW), with a maximum width externally of 1.42m, narrowing to 0.94m. The width between the internal faces of the walls in the narrow part of the structure was 0.49m. This space was filled by three deposits. The lowest fill, [235], comprised a thin (10mm) layer of very compact silt, fine gravel and coal fines. This was overlain by a deposit, [229], of loose, black coal fines and ash, up to 0.25m thick. The uppermost fill, [230], was a 0.56m thick deposit of loose, reddish brown ash and clinker, with patches of ash and occasional brick fragments.

[28] *ibid*.

5.4.17 The material within Structure [236] suggested that it might have formed part of flue, although the function of the timber beams within such a structure was not clear. The limited exposure of the structure within the evaluation trench made a precise interpretation of function impossible, although it is likely that Structure [236] is an element of the same building represented by subterranean Structure [217] exposed in the north-eastern branch of the trench. If this is the case, then Structure [236] is probably also part of the primary phase of construction, and can therefore be assigned a date of around 1860, and an industrial, rather than domestic or administrative function, can be assumed.

5.4.18 To the south-east of the south-eastern wall, [224], of Structure [236], a 0.20m thick deposit, [251], of compact clinker and slag was recorded in section. The layer abutted the wall to the north-west and sealed fill [254] of construction cut [253]. Layer [251] is therefore interpreted as an accumulated deposit associated with the use of the building, and evidently derived from iron processing.

5.4.19 In the north-east facing section of Trench 2 (not illustrated herein), a 0.17m thick deposit, [243], of mixed ash, sand and gravel may be contemporary with the use of Structure [236], although the relationship between the layer and the north-western wall was not clear due to later truncation.

5.4.20 In Trench 5, the north-western wall of a building was represented by two features. In the north-eastern-corner of the trench, Phase 3 deposit [520] was cut by a sub-rectangular construction cut, [530], for a brick structure, [516] (Figure 8; Section 7, Figure 9; Plate 11). The brickwork comprised a maximum of two courses of machine-pressed firebricks, bonded with soft, light grey lime mortar. Although extending beyond the corner limits of excavation, the form of the exposed part of the brickwork suggested that it represented the remains of a square or rectangular pier base, measuring over 0.65m east-west, by >0.35m north-south. The construction cut was backfilled with a deposit, [529], of mixed ash and silty sand.

5.4.21 A second pier base likely associated with the same building was recorded *c*. 4.50m to the south-west. This was represented by a single sandstone block, [518], measuring 650mm x 640mm x 410mm (Figure 8; Plate 11). The block was roughly squared, with visible tool marks on the upper surface and three of its sides. It had been disturbed, and was lying slightly to the north-west of its original position, pitched over on one side. The original position of the block was clearly indicated by an impression in the upper surface of the underlying foundation/make-up deposit, [517], for the block, which comprised crushed brick, slag and mortar.

5.4.22 The evidence recorded in Trench 5 suggests that the building depicted at this location on the Ordnance Survey 1st edition map was an open-fronted affair, perhaps a shed with a roof, supported by posts or iron pillars resting on pier bases of brick or stone construction. This interpretation is consistent with the form of the building on the map. The Phase 3 yard surface, [519]=[521], that pre-dated construction of the building probably continued in use as the floor level. The building may have functioned as a covered storage area for raw materials or finished products.

5.4.23 The earliest deposit recorded in Trench 6 was a layer, [669], averaging 50mm in thickness, of compact, dark grey sand and gravel recorded in plan in the western part of the trench (Figure 8). This layer may have served as the floor level for a Phase 5 structure, [635], as described in due course, although it is possible that it was laid as an external yard surface some time prior to the construction of that building. It was recorded at a maximum height of 15.45m OD. Directly overlying the surface in the central part of the trench were deposits of compact crushed red sandstone, [627], and very compact orange sand, [629], indurated by the absorption of iron compounds (Figure 8; Section 8, Figure 9; Plate 15). Both deposits were narrow and linear in form, aligned north-south, and are interpreted as indicating the former position of a rail associated with the railway that served Gateshead Iron Works, as depicted on Ordnance Survey mapping from 1862. The track seems to have continued in operation for some time after the closure of the ironworks, and was still shown on the 2nd edition map of 1898, serving the South Shore Engineering Works (later Kelvin Works), which utilised part of the former Gateshead Iron Works.

5.5 Phase 5: Late 19th/Early 20th Century

5.5.1 Phase 5 represents continued use of the site subsequent to the closure of what was by then the ironworks of Hawks, Crawshay and Sons in 1889. Evidence for this phase was recorded only in Trench 6, where the structural remains of a building thought to be that shown on the Ordnance Survey 2nd edition map of 1898 were located.

5.5.2 The walls of the aforementioned structure, Structure [635], were built directly on top of yard/floor surface [669] at the western end of the trench. The eastern wall, [662], representing the external wall of the building, was built with machine-pressed bricks and firebricks, bonded with hard, light grey lime mortar (Figure 8; Plates 13, 14). The wall was recorded for a distance of *c*. 1.25m NNE-SSW, continuing beyond the limits of the trench to the south and was 0.56m wide, surviving to a maximum height of five courses (0.46m), recorded at a maximum height of 15.87m OD. Abutting the western face of the wall were two foundations, [664] and [673], consisting of roughly dressed slabs of sandstone, bonded with similar mortar to that used in the external wall. The sandstone slabs served as the foundation courses for two parallel brick walls, [659] and [660], positioned at right angles to wall [662]. The northernmost wall, [659], was of similar construction to wall [662] and measured over 3.38m in length, continuing beyond the western limit of the trench, and was 0.36m (one and a half bricks) wide. This survived to a maximum height of five courses (0.42m), in predominantly stretcher bond, with occasional header bricks in no set pattern. It was recorded at a maximum height of 15.96m OD. It was not clear within the confines of the evaluation trench whether this wall represented the external northern wall of the structure, or an internal partition. The eastern end of the wall would probably have originally been straight-jointed to the western face of wall [662], but the northern part of wall [662] had been removed in this area.

5.5.3 The southern wall, [660], of Structure [635] was also of similar construction to the other walls, and measured 0.23m (1 brick) wide with a maximum height of six courses (0.54m) surviving, recorded at a maximum height of 16.04m OD. It is fairly certain that this wall served as an internal partition within the structure. The wall included re-used firebricks stamped 'LINTZ', manufactured at Lintz Colliery Brick Works (see above). The eastern end of the wall was abutted by the western face of wall [662]. Between the two parallel walls, at a distance of 2.22m from eastern end of the structure, a broad (0.69m wide) partition wall, [661], had been built with its northern end abutting wall [659] and its southern end abutting wall [660]. The wall measured 0.90m NNE-SSW, and had a maximum height of 0.37m. A continuation, [663], of this wall to the south of [660] survived to a height of 0.30m.

5.5.4 Within the structure, one complete 'room' of the building was therefore recorded in plan, defined by wall [659] to the north, wall [660] to the south, wall [661] to the west and wall [662] to the east. The small dimensions of this area, 2.22m WNW-ESE by 0.90m NNE-SSW, means that it could not have had any function that required access. The position of the building, adjacent to the railway line running into Gateshead Iron Works, as depicted on the Ordnance Survey 2nd edition map of 1898, suggests that it may have been a signal box, in which case the ground floor of the building would have housed the gearing for the lever frame above. Alternatively, the 'room' may represent the base of a coal bunker.

5.5.5 Abutting the eastern face of external wall [662] to the west, and the aforementioned indurated sand deposit indicating the position of the rail to the east, was a 60mm thick deposit, [665], of crushed mortar. This deposit may represent an external surface associated with the use of the building. The deposit was overlain by a 0.22m thick layer, [652], of compact, dark greyish brown clayey silt, also abutting the wall and possibly representing an accumulation of material associated with the use of the building.

5.6 Phase 6: Modern

5.6.1 This phase represents activity on the site post-dating the closure of the ironworks in 1889 and relates largely to demolition of 19th-century buildings, and to later terracing and infilling of the site in the 20th century. A brief summary of modern remains is set out below. Figures 3-9 illustrate the remains while Appendix A shows stratigraphic relationships and Appendix B catalogues the remains in summary fashion. Full details of deposits, features and structures can be found in the Site Archive.

5.6.2 In Trench 1, the north-eastern edge of Phase 4 feature [113] was cut by an intrusion, [117], interpreted as representing modern ground disturbance in the south-eastern corner of the site (Section 1, Figure 5). Above this intrusion was a homogeneous sandy silt and ash deposit, [102], up to 1.66m thick, which extended across the extent of the trench and contained lenses of demolition rubble. A machine-pressed brick, stamped 'JONES BROS. PELAW', recovered from this deposit post-dates 1911. This deposit overlay the remains of Phase 4 wall [105], recorded at the north-eastern end of the trench. The layer is interpreted as modern infilling of the south-eastern corner of the site, which is depicted on the Ordnance Survey 1970 map edition as being at a lower level than the yard to the north-west. This deposit was overlain by a spread of hardcore make up, [101], averaging 0.10m in thickness, below a layer of tarmac, [100], which comprised the existing surface of the yard.

5.6.3 In Trench 2, the bases of the walls that comprised Structure [217] were not reached in the evaluation because an indurated deposit, [269], comprising dark reddish brown ash and slag adhered to the brickwork and infilled the base of the feature (Figure 4; Section 4, Figure 6). The upper surface of this deposit was recorded at heights varying from *c.* 15.60m OD at the north-eastern end of the structure to *c.* 15.0m OD in the middle of the excavated part of the building. The deposit was sampled for analysis and was found to consist largely of general foundry floor debris, but with occasional fragments of drossy furnace slag, possibly deriving from a cupola furnace. It is likely that the layer represents material deposited within the structure after it had gone out of use. Above this layer were a series of deposits, [268], [267], [266], [265], [264], [263] and [262], all of which comprised mixed ash and clinker (Section 4, Figure 6; Plate 7). Fill [268] produced nine sherds of pottery, seven of which were from the same vessel. None of the pottery post-dated the early 19th century (see Appendix D). Further details of the fills are summarised in Table 5.1, below, listed from earliest to latest.

Context	***Compaction***	***Colour***	***Maximum thickness (m)***	***Highest level (m OD)***	***Lowest level (m OD)***
268	Loose	Dark grey	0.42	15.39	15.02
267	Strongly cemented	Dark reddish brown	0.50	15.89	15.19
266	Loose	Light grey	0.60	15.49	15.19
265	Loose	Black	0.10m	16.59	15.61
264	Loose	Mid grey	0.21	16.79	15.61
263	Loose	Dark grey	0.25	16.87	16.05
262	Loose	Mid grey	0.55	16.73	16.59

Table 5.1. Summary of fills within Structure [217]

5.6.4 All the deposits tipped downwards from north-east to south-west, and it is likely that they represent secondary deposition of waste tipped into the structure after it had gone out of use. Two of the deposits, [267] and [268], were sampled for analysis, and were found to comprise general foundry debris, including fragments of drossy cupola furnace slag in uppermost of the two deposits, fill [267].

5.6.5 The uppermost fill, [262], of Structure [217] was overlain by a deposit, [211], up to 0.38m thick, of ash, sand, and coal fines, which tipped into the structure to the south-west, and also overlay the walls of the structure (Sections 2 and 4, Figure 6). Above this, an ash deposit, [261], up to 0.35m thick, abutted the north-eastern face of the south-western brick pier, [226], and overlying this was a 70mm thick cinder and gravel deposit, [216] (Section 4, Figure 6). This deposit was overlain by a deposit, [210], of coarse sand with brick fragments (Sections 2 and 4, Figure 6). These deposits are interpreted as being possibly associated with the demolition of the structure, which does not appear on Ordnance Survey mapping by 1898, and which was presumably demolished immediately following the closure of the ironworks in 1889.

5.6.6 Overlying deposit [210] at the north-eastern end of Trench 2 was a 0.14m thick deposit, [209], of sand and ash (Section 2, Figure 6). This was truncated to the north-west by a substantial 'terracing' feature, [208], which ran the length of the north-western edge of the trench, and was recorded in plan and section (Figure 4; Section 2, Figure 6). The maximum recorded depth of the feature was 1.30m. The intrusion was filled by a series of deposits, [207], [206], [205], [204], [203], [247], [248], [249], which generally comprised dumped layers of ash, sand and rubble. The line of the intrusion was aligned approximately with the edge of the 18th-century reservoir/mill pond depicted on the 1772 map of the area, although it was clearly cut from a level that post-dated construction of the 18th-century feature by a considerable period of time. It is possible that retaining walls of the feature survived below ground until after the closure of the ironworks, and that the intrusion therefore represents extraction of masonry associated with the walls in the modern era.

5.6.7 In the north-west facing section of Trench 2, upper demolition deposit [210] was overlain by a 0.13m thick compact layer, [202], of silt and gravel that served as make-up for two successive layers of tarmac, [201]=[283] and [200], the uppermost of which, [200], represents the existing surface of the yard. In the south-west facing section of the south-eastern part of the trench the make-up layer was cut by a vertical sided service trench, [234], 0.68m wide and 0.55m deep, containing an iron pipe of 175mm external diameter (Section 3, Figure 6).

5.6.8 In the north-east facing section of Trench 2, the upper fill [249] of 'terracing' feature [208] was cut by a 0.85m deep modern intrusion, [241], which contained two fills, [240] and [239].

5.6.9 In Trench 3, all of the deposits overlying natural sand and gravel were assigned to this latest phase of activity. Of the two earliest levelling deposits, [318] and [325] in Trench 3, one comprised an ash layer, [325], over 0.38m thick, with frequent inclusions of glass slag and other waste materials associated with the glass-making industry (Section 5, Figure 7). There is no evidence that there was ever a glassworks within the site, and it is therefore thought likely that the layer represents imported waste or demolition material from a nearby glassworks. The other deposit, [318], comprised mixed dark grey silt and mid yellowish brown clay. These deposits were overlain by a silty sand layer, [317], containing occasional brick and sandstone fragments, which extended along the extent of the trench and was over 0.40m thick.

5.6.10 The overlying deposits, [303-316], [319-324], [326-330], are collectively interpreted as dumped deposits forming part of a gradual infilling/levelling of the site in the 20th century. These deposits generally tipped downwards from west to east in the south-western end of the trench, and levelled out towards the north-eastern end. In general the deposits were composed predominantly of ash/cinder and waste materials from industrial processes. Of note was layer [324], up to 0.21m thick, which contained frequent pieces of burnt rope, representing waste material from the rope-making industry, which was also common in the area. It is possible, though conjectural, that this deposit derives from the clearance of David Haggie and Son's nearby hemp rope works, which burnt down in 1884.[29]

[29] Carlton 1974.

5.6.11 Another of the deposits was a layer, [314], up to 0.20m thick, which comprised off-cuts of leather and parts of shoes, mostly worn through soles. This deposit represents waste material from a cobbler's workshop. Another of the dump layers, [326], comprising ash and silt up to 0.20m thick, had frequent inclusions of scrap copper or copper alloy. It can be seen, therefore, that the dumped deposits derived from a variety of different industrial processes, not necessarily associated with the site. It is likely that throughout the earlier part of the 20th century, the land was utilised as a tip, until the site was re-developed in the 1950s.

5.6.12 The uppermost layers recorded in Trench 3 related to the recent use of this part of the site for vehicular parking. Overlying the latest of the dumped waste deposits was a 0.30m thick deposit, [302], of sandy silt and crushed brick and sandstone rubble. This was overlain by a 0.20m thick gravel deposit, [301]. These deposits are interpreted as make-up for a layer of tarmac, [300]. The maximum height recorded on the upper surface of the tarmac in Trench 3 was 18.01m AOD.

5.6.13 In Trench 4, deposits immediately overlying natural sand and gravel are interpreted as deriving from modern levelling. The earliest of these was a layer, [407], only 40mm thick, of compact dark grey silty clay with frequent fragments of brick and coal (Section 6, Figure 7). It is possible that this deposit, whilst not representing a surface *per se*, may relate to storage of coal in this part of the site, and should possibly be assigned to Phase 4. Overlying this was a 0.80m thick sandy silt and ash deposit, [406], containing occasional inclusions of glass waste (Figure 3; Section 6, Figure 7). Above this deposit was a silt, ash and rubble layer, [405], including machine-pressed brick and concrete fragments, which varied in thickness from 0.25m to 0.70m. The overlying deposit, [404], which was up to 1.25m thick, comprised ash, silt and coal fines. The latest of the levelling deposits was a layer, [403], comprising yellowish brown silty clay, varying in thickness between 0.20m and 0.50m, recorded intermittently in section. The combined thickness of the levelling deposits in Trench 3 was *c*. 2.30m.

5.6.14 The remaining deposits recorded in Trench 4 comprised a 0.28m thick gravel hardcore deposit, [402], which underlay the existing tarmac surface, [400], at the north-western end of the trench. Towards the south-eastern end of the trench, the tarmac was laid directly on levelling deposits [403] and [404]. Around 2-3m from the south-eastern end of the trench, the tarmac surface had been patched with concrete, [401]. The maximum height recorded on the upper surface of the tarmac in Trench 4 was 18.04m OD.

5.6.15 In Trench 5, the Phase 4 south-western pier base was overlain by a 0.59m thick deposit, [515], of silt, ash and coal fines (Section 7, Figure 9). This layer contained frequent brick inclusions, comprising fragments of brick along with whole bricks and sections of brickwork mortared together. The bricks included firebricks, some of which were slagged and vitrified. Stamps noted on the firebricks included 'COWEN', 'LINTZ' and 'SM', these possibly manufactured at Stormont Main colliery in Wrekenton. Other inclusions within the deposit included lumps of drossy furnace slag, some of substantial size, and fragments of pantile. The deposit is interpreted as deriving from the demolition of buildings associated with the ironworks subsequent to its closure in 1889.

5.6.16 The layer, [514], overlying this deposit was of similar composition, and was probably also associated with the demolition/levelling of the ironworks buildings, as was a 0.31m thick silty sand deposit, [528], with frequent sandstone and slate inclusions, which overlay demolition spread [515] at the south-western end of the trench. Deposits [514] and [528] were cut by a steep-sided intrusion, [513], recorded in section, which measured 3.09m NE-SW and was 0.63m deep. Its four fills, [512], [511], [510] and [509], comprise mostly ash, clinker and coal fines.

5.6.17 At the north-eastern end of Trench 5, the upper demolition spread [514] was cut by another modern intrusion, [508], 0.64m deep, and filled with mixed ash and coal fines, [507] and [506]. Both modern intrusions were overlain by a deposit, [505], up to 0.50m thick, of mixed ash, coal fines and crushed mortar. This layer was cut, at the north-eastern end of the trench, by an intrusion, [504], containing three fills, [503], [502] and [501], variously comprising ash and coal fines. At the south-western end of the trench, mixed ash layer [505] was cut by a steep-sided pipe trench, [527], 0.45m deep, containing a ceramic pipe of 130mm external diameter, and backfilled with concrete, [526]. The existing reinforced concrete floor slab, [500], was 0.25m thick on average and was recorded at a maximum height of 17.28m OD.

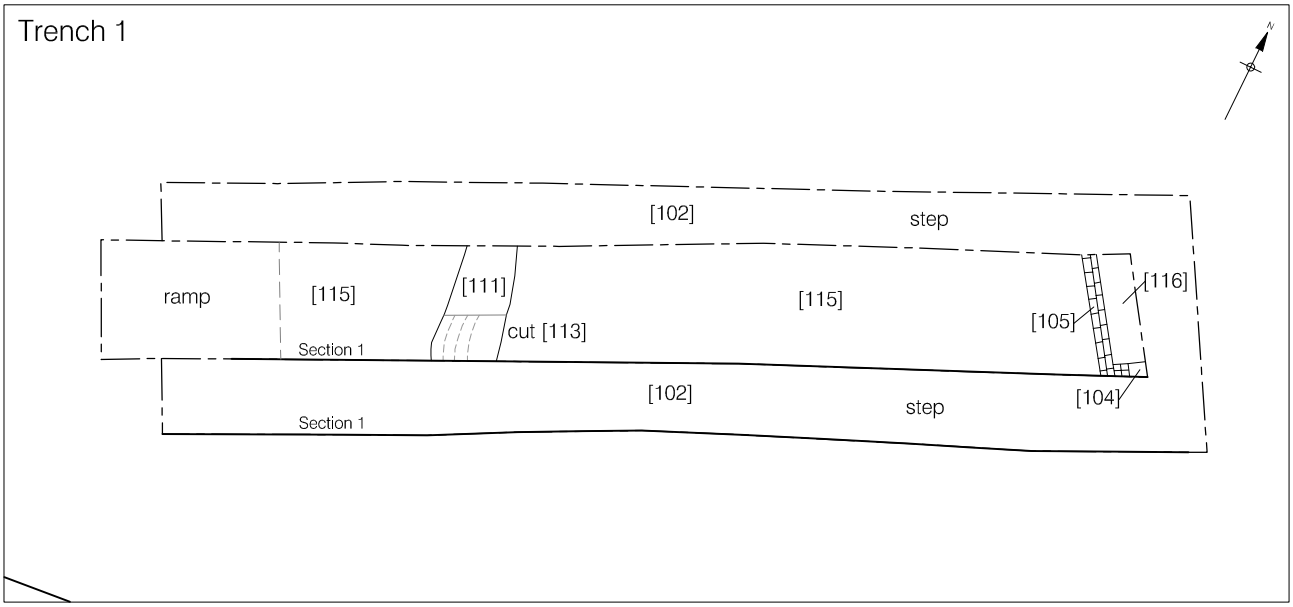
5.6.18 In Trench 6, the walls associated with the late 19th-century structure were overlain by a deposit, [656]=[657], up to 0.92m thick, of mixed ash, coal fines, coke breeze and dense tap slag, probably deriving from a cupola furnace. This is interpreted as a dump of industrial waste from the use of the ironworks, but re-deposited after the demolition of the trackside building as part of the levelling of the site in the early 20th century. The deposit was not present to the north of the northern wall, [659], of the structure, where the wall was overlain by a 0.25m thick layer, [636], of crushed brick, below a 0.30m thick deposit, [634], of crushed mortar. Both of these deposits are interpreted as deriving from the demolition of the building. The upper demolition deposit, [634], was cut, at the western end of the trench, by an intrusion, [670], recorded in section (Section 8, Figure 9). The fills of this feature comprised a mixed ash and crushed mortar deposit, [633], and a crushed mortar and brick deposit, [632], presumably also representing demolition material. The intrusion is interpreted as being associated with the demolition of the structure. This cut was probably also represented in the north facing section of the trench, where a steep-sided intrusion, [672], with two fills, [655] and [654], of mixed ash and mortar was recorded. The base of the intrusion coincided with the top of wall [663], indicating that the cut was probably associated with the removal of masonry from the wall.

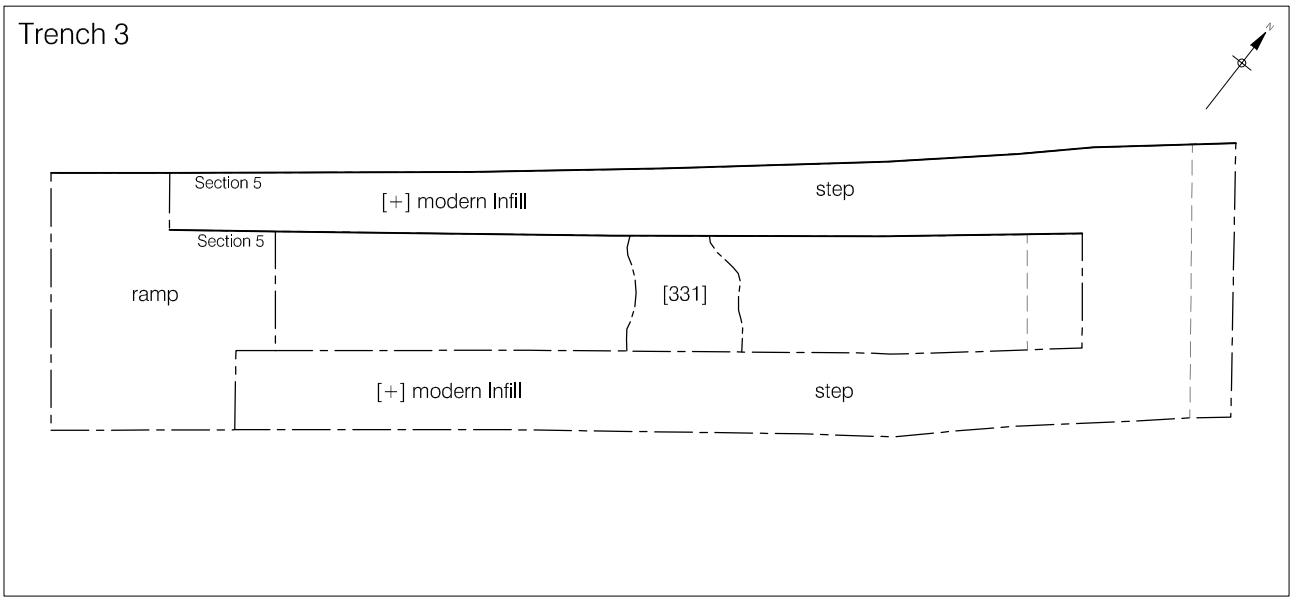
5.6.19 Demolition layer [634] was overlain by a 0.15m thick ash and crushed mortar deposit, [631], overlain by a 0.27m thick black silt deposit, [619], which appeared to be associated with a brick structure, [620], that was partially revealed in section (Section 8, Figure 9), running roughly parallel to the trench. The structure was of firebrick construction, laid in stretcher bond, and three courses (0.23m high) were recorded in the south-facing section of the trench. Because the structure was only partially revealed, its precise form and function were unclear, as was its position within the stratigraphic sequence. For this reason the structure is shown as overlying 'NFE' (No Further Excavation) in Appendix A. The brickwork possibly represents part of a drain. Silt deposit [619] may be the fill of a construction cut associated with the structure, although this could not be ascertained, particularly as the base of the structure was not established.

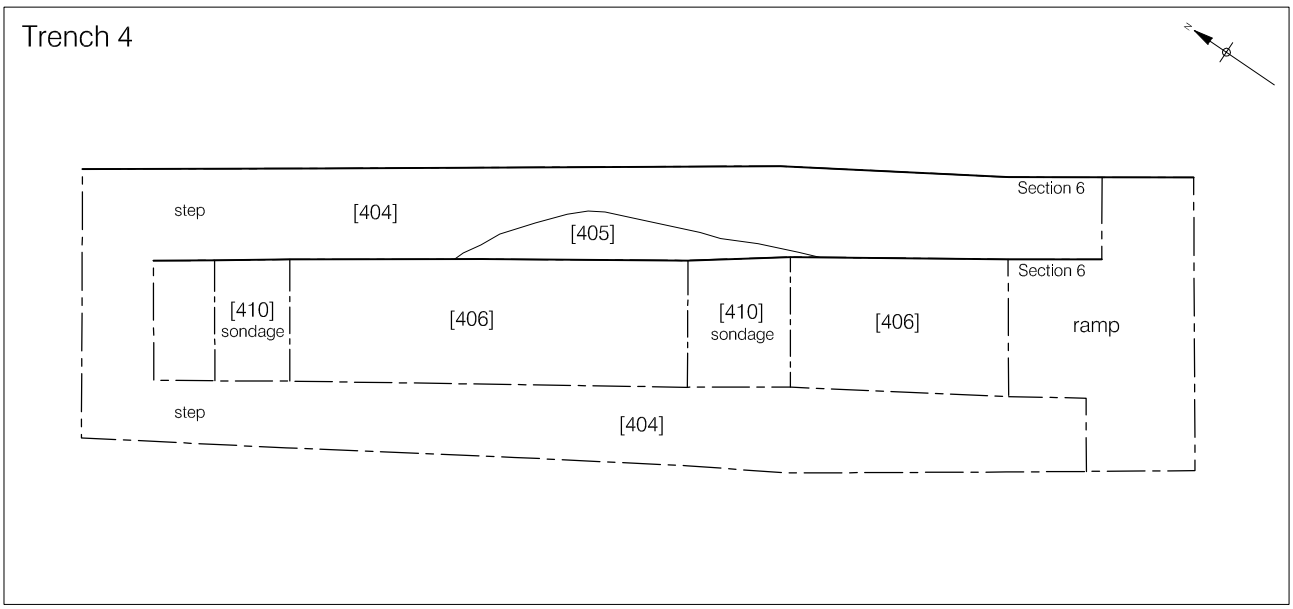
5.6.20 A brick-built structure, [650], was recorded in the north-facing section of Trench 6 (Figure 8). The structure comprised machine-pressed brick, laid predominantly in stretcher bond, with occasional header and partial bricks. The structure measured over 2.36m WNE-ESE, and was over 1.29m in height. The brickwork was bonded with hard, light grey mortar, with unpointed joints, suggesting that the northern face was not a visible part of the structure. The face of the brickwork was not plumb, with bricks in the middle of the section revealed projecting up to 0.21m north of the courses at the top and the base. The structure was interpreted as possibly a culvert side wall. As the structure was only partially revealed within the section, and ran roughly parallel to the trench, it was not possible to ascertain with any confidence the position of the feature with the stratigraphic sequence, since it was not clear whether the structure was trench-built, and if so, what level it was cut from. For this reason the structure is shown as overlying 'NFE' (No Further Excavation) in Appendix A. It seems likely that the structure post-dated use of the railway and trackside building, as it lay across the line of the track, at a higher level.

5.6.21 The remaining deposits recorded in Trench 6 post-date demolition of the late 19th-century trackside building, and are interpreted as being associated with the levelling/infilling of the site. In the eastern half of the trench, a 'terracing' feature, [668], was filled by various ash and crushed mortar deposits, [625], [653], [624], [623], [622] and [621] (Section 8, Figure 9). The lowest of these deposits, [625], abutted the western side of the compacted deposits, [626] and [627], indicating the line of the removed rail. To the east, was a deposit, [628], of loose sand and ash which may also have been within feature [668]. The fills of 'terracing' feature [668] were truncated to the east by a vertical-sided intrusion, [630], the base of which was not reached within the evaluation trench. Above the feature was a series of deposits, [674], [640], [639], [638], [637]=[647], [617], [616], [615], [614]=[646], [648], [649], [651], [613]=[645], [644], [612], all associated with the infilling/levelling of the site in the 20th century. These variously comprised sand, slag, ash, cinder, coal fines and mortar. The maximum exposed combined thickness of these deposits was *c*.1.20m.

5.6.22 Above the uppermost fill of the intrusion was a series of deposits of modern dumped levelling layers, [611], [610], [609], [608], [607], [606], [605], [604], [603], [602], 643], [642], [641], all recorded in section, with a maximum combined thickness of *c*. 0.80m. For further details of these deposits see Appendices A and B, and Section 8, Figure 9. The latest of these deposits, layer [602], was cut by a steep-sided pipe trench, [667], containing a plastic drain pipe of 0.22m external diameter, and backfilled with concrete [666]. The fill of the pipe trench was overlain by a deposit, [601], up to 0.15m thick, of crushed concrete hardcore that served as a make-up layer for the reinforced concrete floor slab, [600], within the existing building. This was recorded at a maximum height of 17.47m OD in Trench 6.







0 5m

Figure 3
Plan of Trenches 1, 3 and 4
1:125 at A4

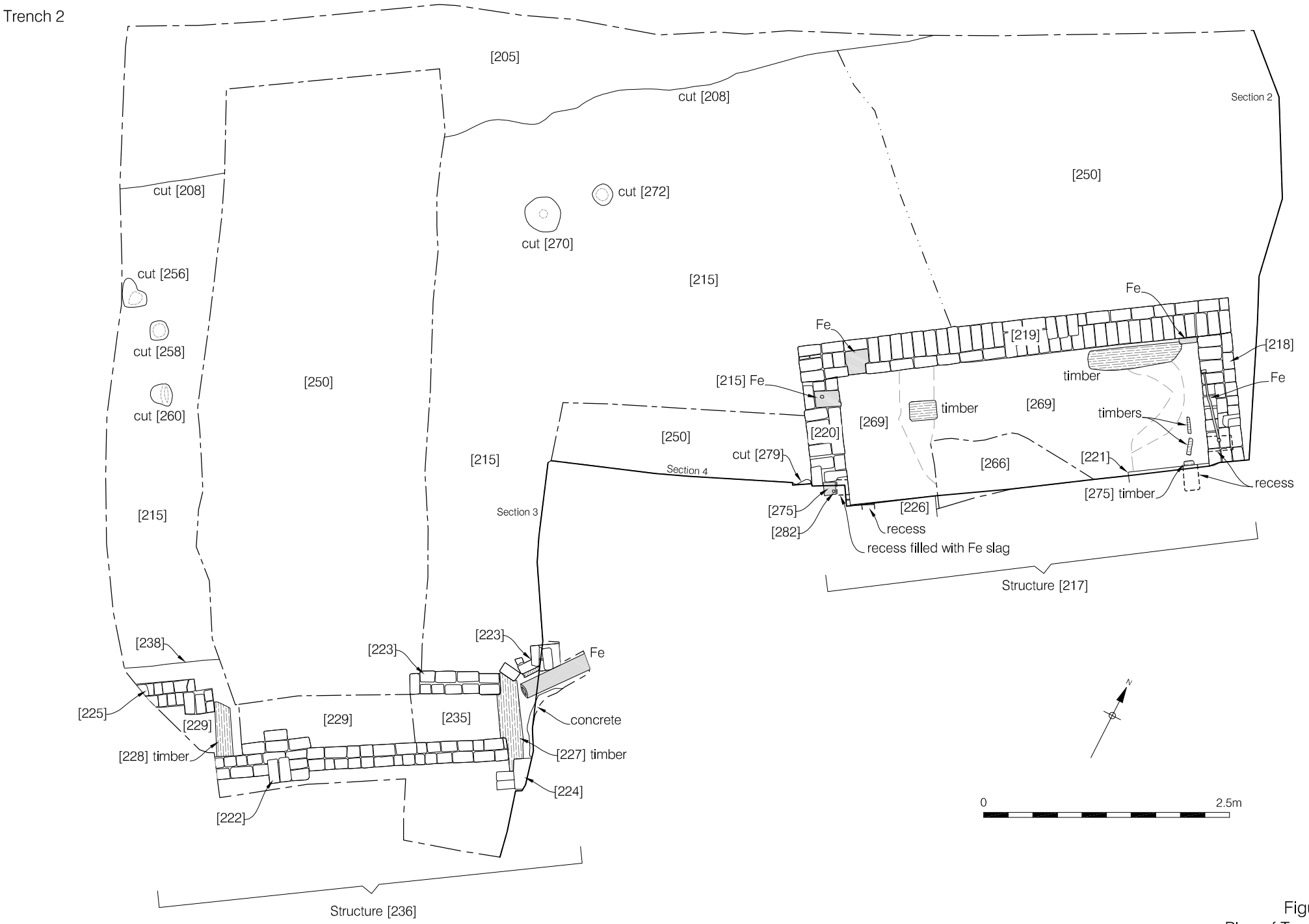
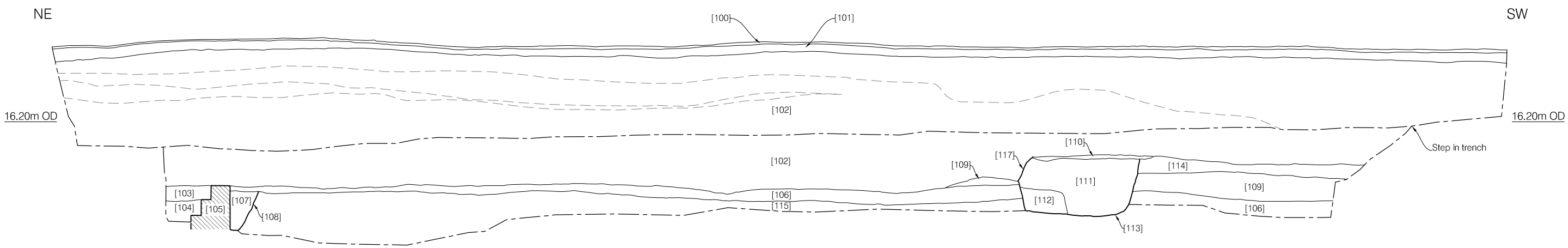


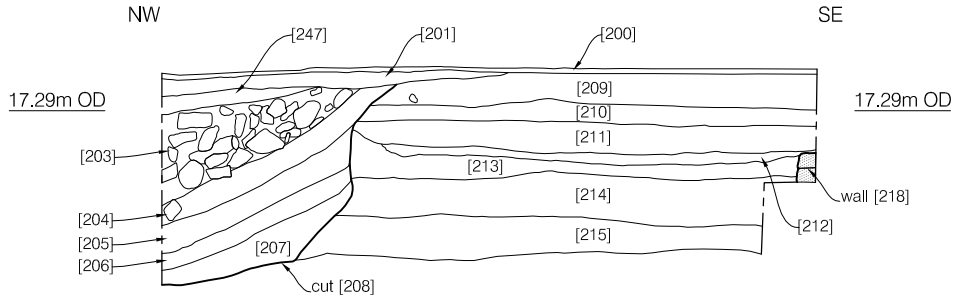
Figure 4
Plan of Trench 2
1:50 at A4



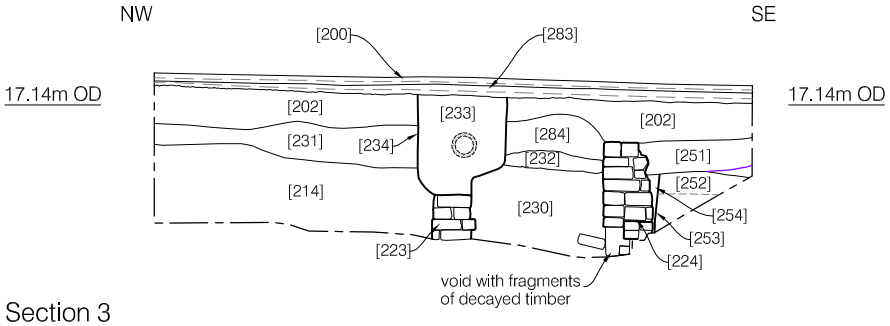
Section 1
Trench 1
North-west Facing

0 2.5m

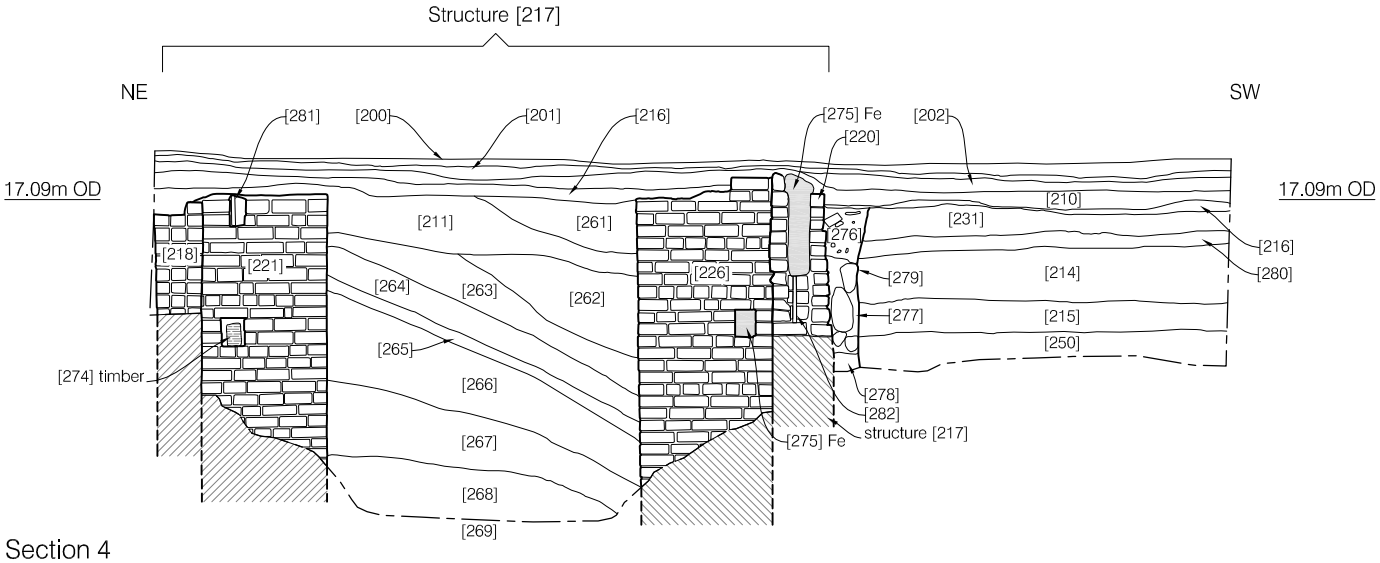
Figure 5
North-west facing section of Trench 1 (Section 1)
1:50 at A3



Section 2
Trench 2
South-west Facing



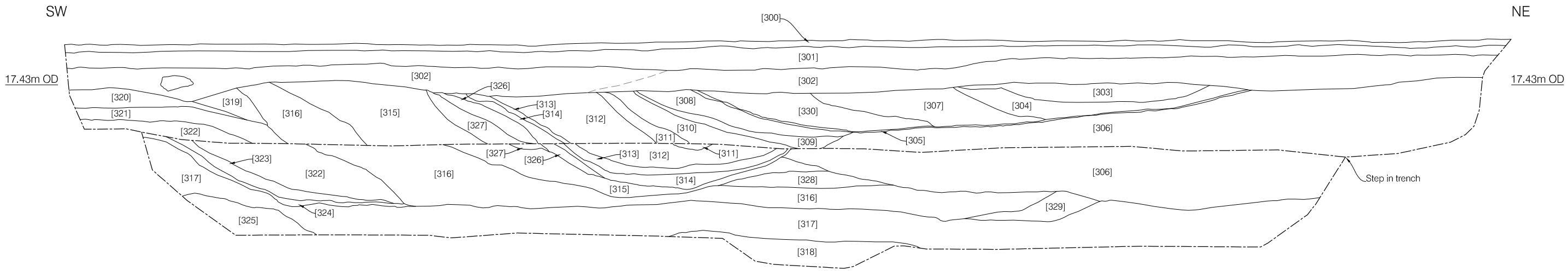
Section 3
Trench 2
South-west Facing



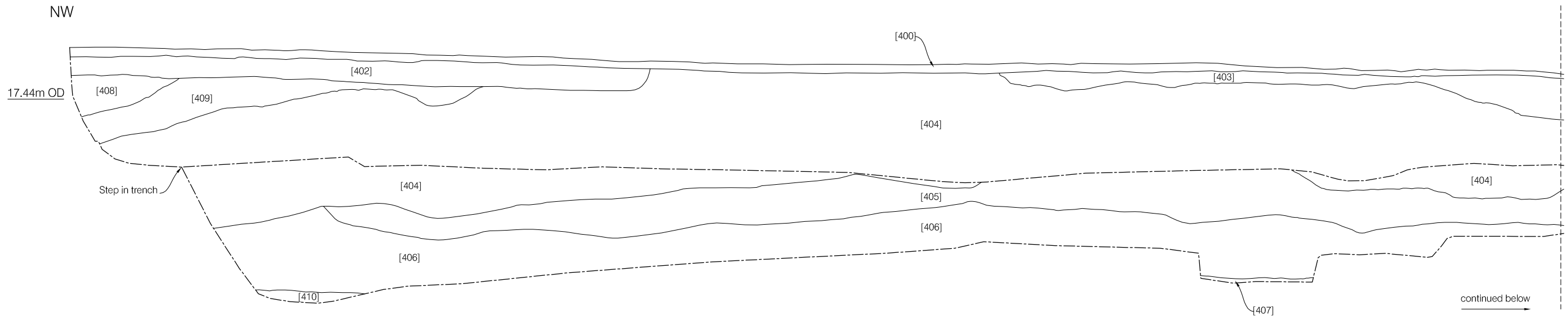
Section 4
Trench 2
North-west Facing

0 2.5m

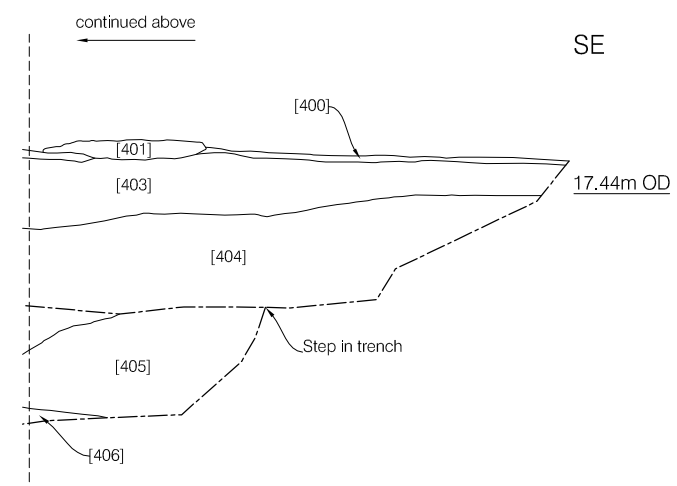
Figure 6
Sections 2, 3 and 4 of Trench 2
1:50 at A4



Section 5
Trench 3
South-east Facing

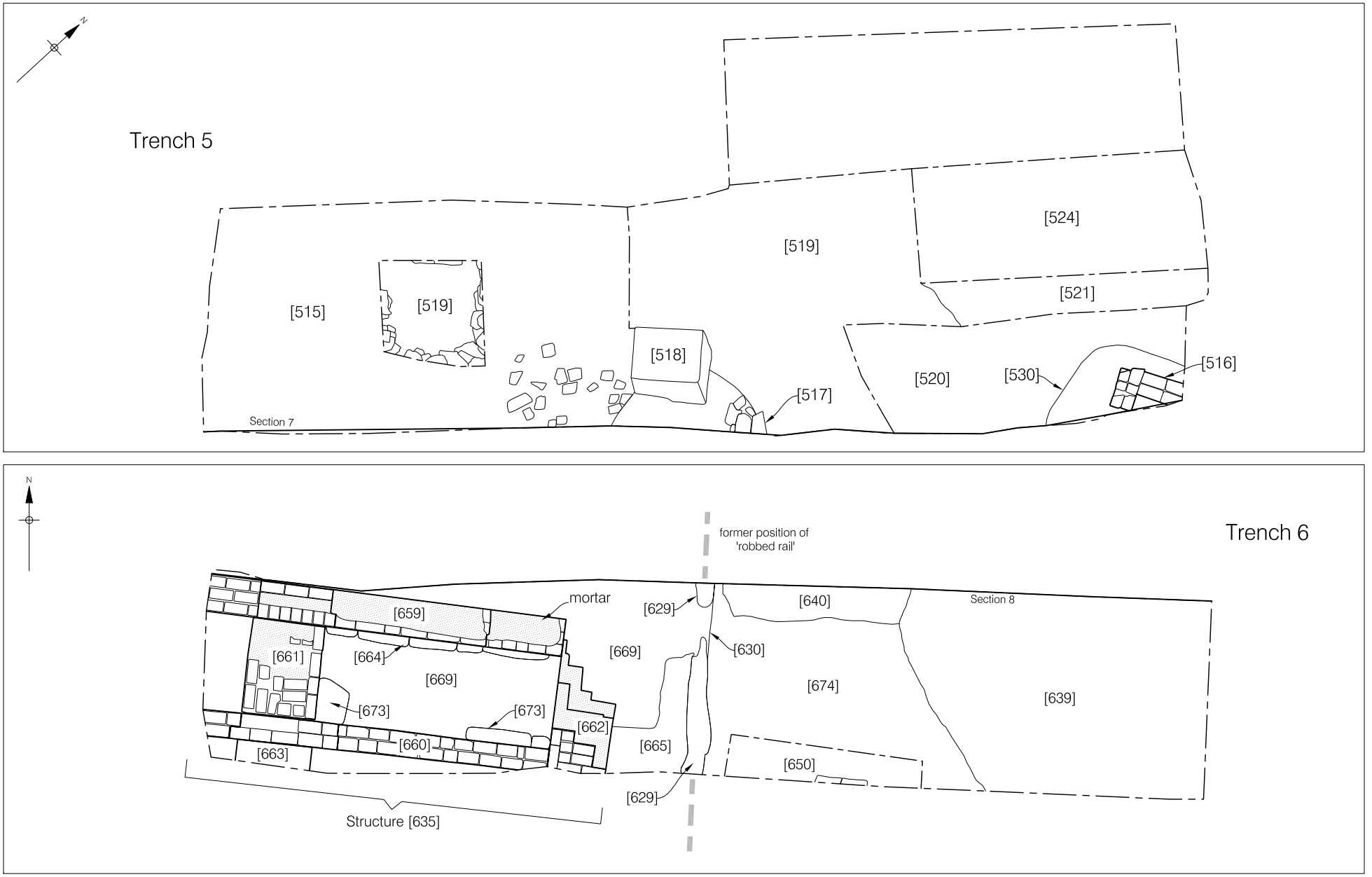


Section 6
Trench 4
South-west Facing



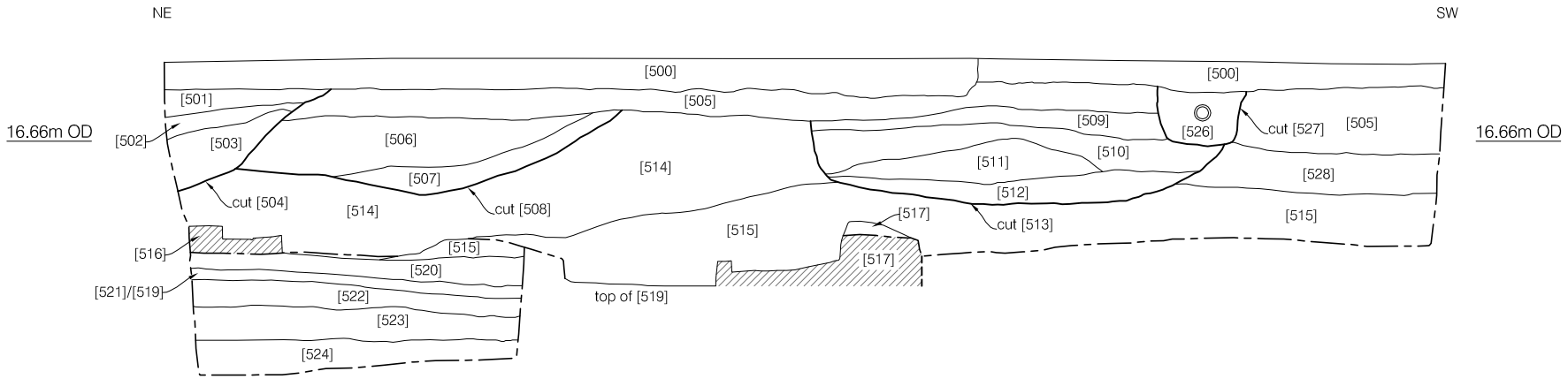
0 2.5m

Figure 7
Sections 5 and 6 from Trenches 3 and 4
1:50 at A3

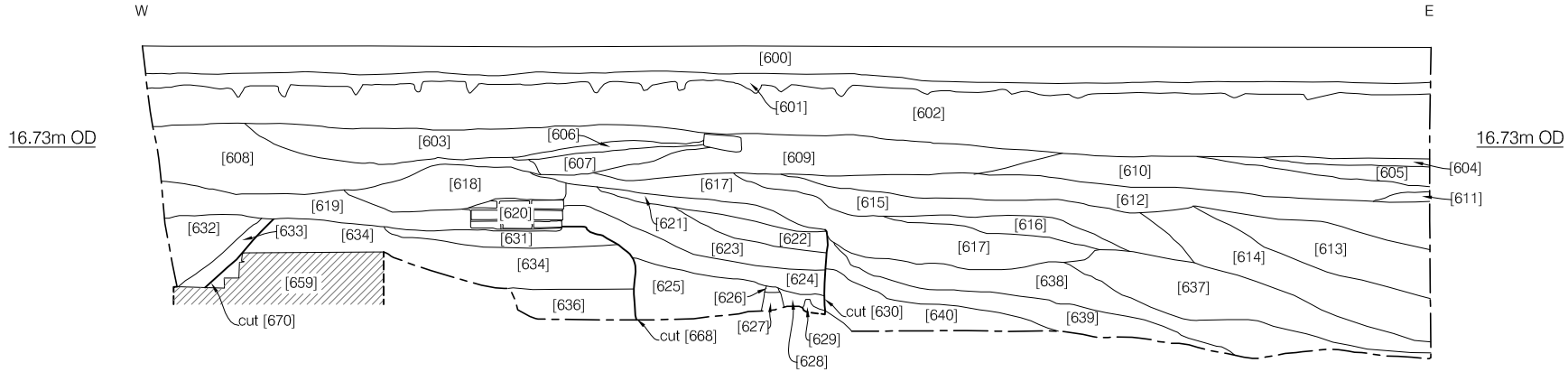


0 2m

Figure 8
Plans of Trenches 5 and 6
1:50 at A4



Section 7
Trench 5
North-west Facing



Section 8
Trench 6
South Facing

0 2m

Figure 9
Sections 7 and 8 from Trenches 5 and 6
1:50 at A4

6. CONCLUSIONS

6.1 Geological deposits and archaeological deposits and features encountered during the evaluation have been assigned to six phases of activity:

- Phase 1. The natural sand and gravel sub-stratum was recorded in Trenches 1-5, this material being of geological, likely fluvioglacial, origin.
- Phase 2. Medieval to post-medieval soil horizons were recorded in Trenches 2 and 5. These were the earliest archaeological deposits to be encountered during the work, representing agricultural usage of the area between the 13th century and the 17th/early 18th century.
- Phase 3. Deposits representing activity on the site in the later 18th and early 19th century were recorded in Trenches 2 and 5. This activity was associated with the early phase of Hawks' ironworks. Later deposits of this phase contained inclusions derived from the processing of iron. No structural remains associated with the early phase of the ironworks were located.
- Phase 4. Structures and deposits associated with the expansion of the ironworks in the mid 19th century were recorded in Trenches 1, 2 and 5. The structural remains included part of the external wall of a building in Trench 1, and an underground structure and possible flue in Trench 2. The structural remains in Trench 2 likely represent elements of the same building, constructed *c*. 1860, which certainly fulfilled an industrial role, although the precise function was not determinable due to the limited exposure of the features within the evaluation trench. Deposits associated with the structures were also recorded, providing clear evidence of iron processing. The structural evidence recorded in Trench 5 was limited to the remains of two pier bases overlying an area of hard standing. It is possible that an existing external yard surface was covered by an open sided shed, first shown on the Ordnance Survey 1st edition map of 1862, to provide a covered storage area for raw materials. Because of the nature of this building, it was considered to be of low archaeological significance.
- Phase 5. A brick structure recorded in Trench 6 post-dated closure of the ironworks. The railway that had served the works from the mid-19th century continued in use after the closure of Hawks, Crawshay and Sons in 1889, until the early 20th century. The alignment of the structure in Trench 6 suggested that it was a trackside building first depicted on Ordnance Survey 2nd edition map of 1898, which seems to have replaced an earlier building further north and on the opposite side of the tracks. The position of the building adjacent to and aligned with the railway line suggests that it was either an associated signal box or coaling station, although it may have served a number of combined functions. Because of the late date of the structure, and the fact that it was not associated with the ironworks, it was considered to be of low archaeological significance.

- Phase 6. Modern deposits post-dating the closure of Hawks, Crawshay and Sons and the disuse of the railway were recorded in all trenches. In Trenches 3 and 4, modern deposits lay immediately above the natural sub-stratum, indicating that extensive disturbance of the site had taken place in the north-eastern part of the site in the 20th century. In Trench 2, the edge of a substantial 'terracing' feature was recorded. This probably indicates the northerly limit of the area of the site where archaeologically significant remains survive. Trenches 1, 5 and 6, to the south of the feature in Trench 2, showed evidence of modern terracing and infilling on a smaller scale to that recorded to the north.

6.2 In sum, therefore, the trial trenching evaluation provided evidence for occupation of the southern part of the site from the 13th century onwards. The occupation was not intensive until the latter half of the 18th century, consistent with the foundation date of William Hawks iron manufactory at New Greenwich on the South Shore in Gateshead. Preservation of structures associated with the later ironworks, dating from *c*. 1860, was reasonably good. There is very high potential for the survival of other parts of the recorded structures and possibly other structures of this date within the southern part of the site. The potential for survival of elements of the reservoir/mill pond from the earliest phase of the ironworks in this area appears to be low, as no structural remains of the feature were recorded during the work.

6.3 It is concluded that the results of the evaluation indicate that there is very high potential for pre-construction groundworks in the re-development scheme to impact severely upon archaeological remains of regional significance. The remains of the greatest significance are those exposed in evaluation Trench 2 at relatively shallow depth below the existing ground surface. The remains are of late post-medieval industrial era date and represent later structural elements of the iron manufactory originally founded by William Hawks in the mid 18th century as well as associated and earlier stratigraphy. It is recommended, therefore, that there should be further exposure and investigation of these remains ahead of the re-development, through a further phase of archaeological excavation, recording, sampling and subsequent reporting to an appropriate level. Trench 2 should be extended to the south and east in order to conduct such work.

6.4 Structural remains recorded to the south-east, in Trench 1, and to the south-west, in Trenches 5 and 6, are of far lesser significance than those recorded in Trench 2, due to either their nature, later date, or the fact that they were not associated with the ironworks. Therefore no further archaeological work is recommended in the western part of the site, the area occupied by the existing warehouse/works building of CPS Haulage. In addition no further work is recommended to the north of Trench 2 in the eastern part of the site, due to the high levels of modern era disturbance recorded there by the evaluation.

7. REFERENCES

Bibliography

Atkinson, F., 1974. *Industrial Archaeology of North East England,* David and Charles.

Bailey, M.R., 2003. *Robert Stephenson, the Eminent Engineer,* Ashgate Publishing Limited.

Bell, I.L., 1863. *Industrial Resources of Newcastle and its Neighbourhood,* in Bruce 1863.

Bell, I.L., 1864. 'On the manufacture of iron in connection with the Northumberland and Durham coalfield'*, Transactions of the North of England Institute of Mining Engineers* Vol. 13, 110-155.

Beresford, M. and Finberg. H.P.R., 1974. *English Medieval Boroughs: A Handlist,* David and Charles.

Brown, D.H., 2007. *Archaeological Archives. A guide to best practice in creation, compilation transfer and curation,* Archaeological Archives Forum.

Bruce, J.C. (ed.), 1863. *Handbook to Newcastle-upon-Tyne,* Longmans.

Carlton, I.C., 1974. *A Short History of Gateshead,* Gateshead Corporation.

Davison, P.J., 1986. *Brickworks of the North-East*, Gateshead Public Library.

Department for Communities and Local Government, 2010. *Planning Policy Statement 5, 'Planning for the Historic Environment'*, HMSO.

English Heritage, 2006. *Management of Research Projects in the Historic Environment*, English Heritage.

Harrison, J.K., 1979. 'The production of pig iron in Northeast England', in Hempstead (ed.) 1979.

Hempstead, C.A. (ed.), 1979. *Cleveland Iron and Steel: Background and Nineteenth Century History,* British Steel Corporation.

Historical Publishing Company, 1889. *Tyneside Industries*: *Newcastle and District,* Historical Publishing Company.

Institute for Archaeologists, 2008a. *Standard and guidance for archaeological field evaluation*, IfA.

Institute for Archaeologists, 2008b. *Standard and guidance for the creation, compilation, transfer and deposition of archaeological archives,* IfA.

Nolan, J. and Vaughan, J. 2002. *Excavations at the Site of the Regional Music Centre, Oakwellgate, Gateshead,* ARCUS unpublished.

Parker, J., 2006. *Kelvin Works, South Shore Road, Gateshead,* TWM Archaeology Report No. 445, Tyne and Wear Museums unpublished.

Parker, J., 2007. *Former Ingersoll Rand Site, South Shore Road, Gateshead; Archaeological Excavation,* TWM Archaeology Report No. 657, Tyne and Wear Museums unpublished.

Petts, D. and Gerrard, C. 2006. *Shared Visions: The North-East Regional Research Framework for the Historic Environment*, Durham County Council.

Pre-Construct Archaeology, 2010. *Project Design for Phase 2 of an Archaeological Evaluation at the Former CPS Haulage Limited Site, Hawks Road, Saltmeadows, Gateshead, Tyne and Wear*, PCA unpublished.

Read, no date. *Some notable members of the Hawks Family,* Gateshead and District Local History Society Vol. 1.

Tyne and Wear Specialist Conservation Team, 2009. *Specification for Preliminary Archaeological Evaluation at CPS Haulage Limited, Hawks Road, Saltmeadows, Gateshead, NE8 3AD*, T&WSCT, Newcastle City Council unpublished.

Under Construction Archaeology, 2008. *Proposed Development Off Hawks Road, Gateshead, Tyne and Wear. Archaeological Desk-Based Assessment,* UCA unpublished.

Walker, K., 1990. *Guidelines for the preparation of Excavation Archives for Long-term Storage,* UKIC.

Online Sources

British Geological Survey website at: http://www.bgs.ac.uk

Sitelines, the Tyne and Wear Historic Environment Record website, at: http://www.twsitelines.info/

8. ACKNOWLEDGEMENTS AND CREDITS

Acknowledgements

Pre-Construct Archaeology would like to thank Prospect Archaeology for commissioning the archaeological evaluation herein described on behalf of the developers. The role of Nansi Rosenberg of Prospect Archaeology is acknowledged.

The roles of Ian Ayris, Historic Environment Section Manager, and Jennifer Morrison, Archaeology Officer, of the Tyne and Wear Specialist Conservation Team attached to Newcastle City Council, are acknowledged.

PCA Credits

Project Manager: Robin Taylor-Wilson

Fieldwork: Alan Telford (Site Supervisor), Derek Moscrop and Scott Vance

Report: Alan Telford

Post-Excavation Management: Jenny Proctor

Illustrations: Mark Roughley

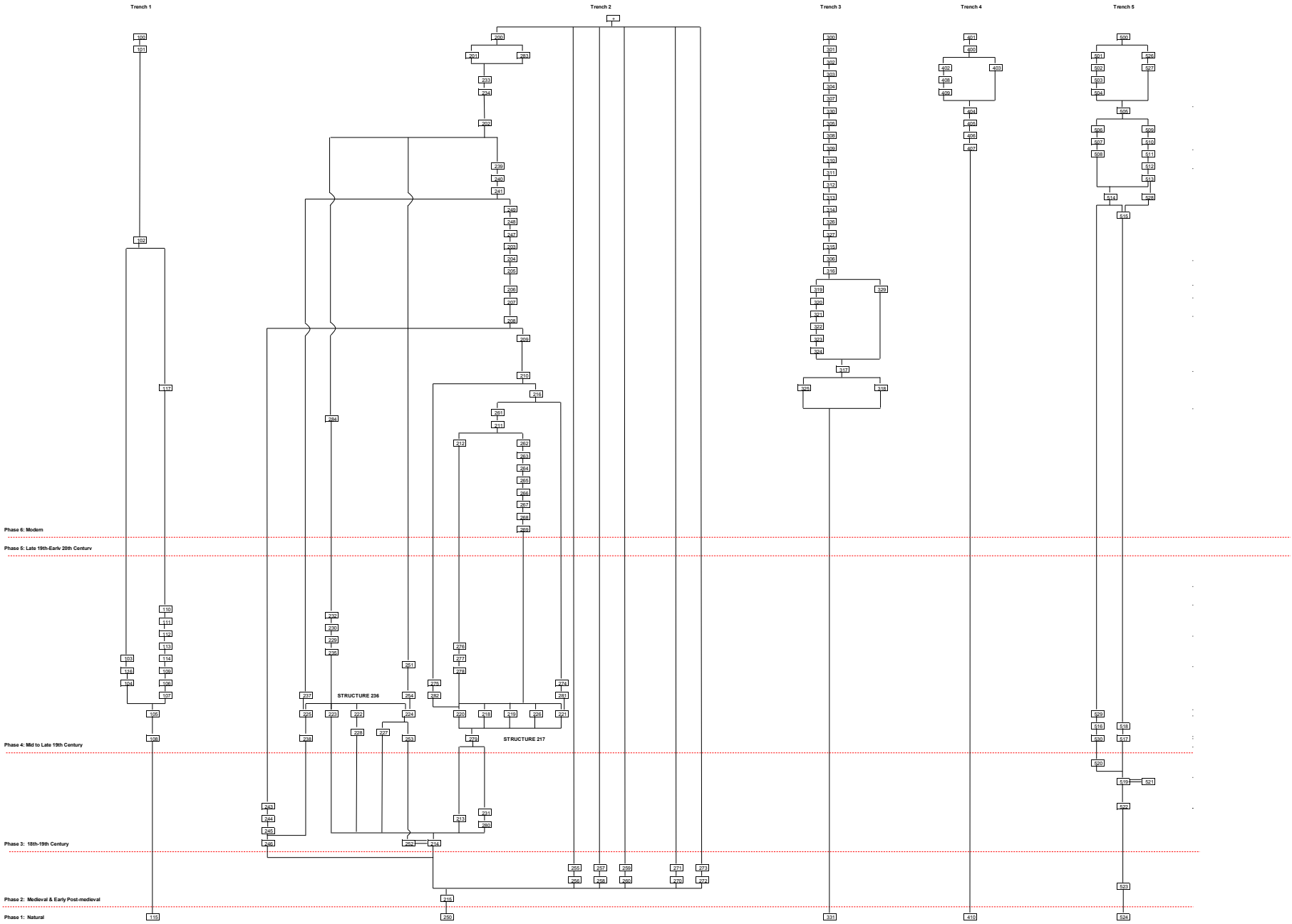
Other Credits

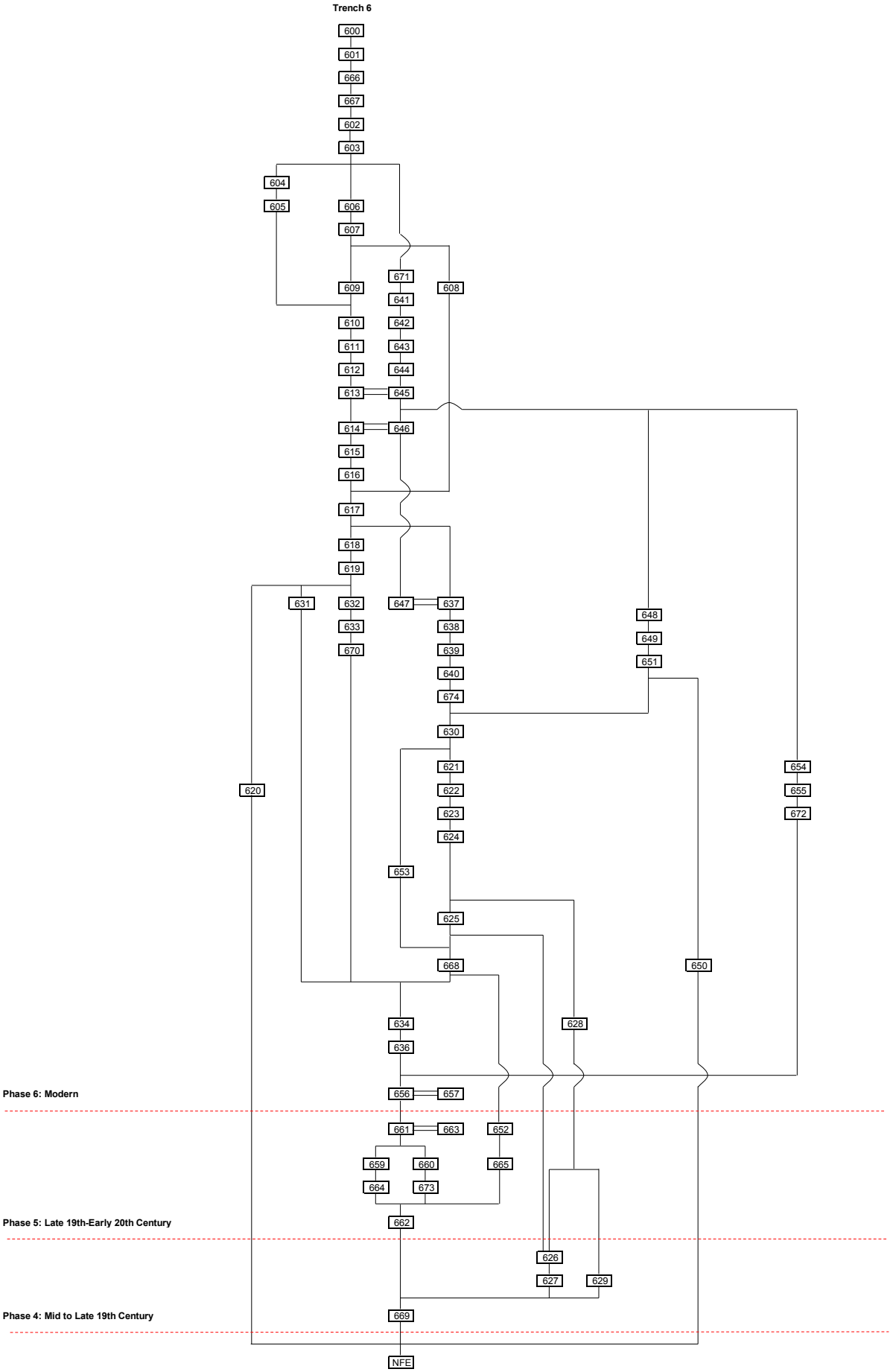
Pottery Report: Jenny Vaughan (Northern Counties Archaeological Services)

Clay Pipe/CBM Report: John Nolan (Northern Counties Archaeological Services)

Metalworking Residues Report: Dr. Rod Mackenzie

APPENDIX A
STRATIGRAPHIC MATRICES


Trench 1
Trench 2
Trench 3
Trench 4
Trench 5
Phase 6: Modern
Phase 5: Late 19th-Early 20th Centurv
Phase 4: Mid to Late 19th Century
Phase 3: 18th-19th Century
Phase 2: Medieval & Early Post-medieval
Phase 1: Natural
STRUCTURE 236
STRUCTURE 217


Trench 6
600
601
666
667
602
603
604
605
606
607
671
609
608
641
610
642
611
643
612
644
613
645
614
646
615
616
617
618
619
631
632
647
637
633
638
670
639
640
674
630
621
620
622
623
624
653
625
668
650
634
628
636
Phase 6: Modern
656
657
661
663
652
659
660
665
664
673
Phase 5: Late 19th-Early 20th Century
662
626
627
629
Phase 4: Mid to Late 19th Century
669
NFE
648
649
651
654
655
672

APPENDIX B
CONTEXT INDEX

Context	*Trench*	*Phase*	*Type 1*	*Type 2*	*Interpretation*
100	1	6	deposit	layer	tarmac surface
101	1	6	deposit	layer	make-up for surface [100]
102	1	6	deposit	layer	demolition dump
103	1	6	deposit	layer	demolition dump
104	1	4	deposit	layer	make-up for surface [116]
105	1	4	masonry	wall	brick wall
106	1	4	deposit	layer	occupation deposit
107	1	4	deposit	fill	fill of [108]
108	1	4	cut	linear	construction cut for wall [105]
109	1	4	deposit	layer	demolition dump
110	1	4	deposit	fill	fill of [113]
111	1	4	deposit	fill	fill of [113]
112	1	4	deposit	fill	fill of [113]
113	1	4	cut	linear	gully/ditch
114	1	4	deposit	layer	occupation deposit
115	1	1	deposit	natural	natural sand and gravel
116	1	4	deposit	floor	concrete surface abutting wall [105]
117	1	6	cut	linear	intrusion
200	2	6	deposit	layer	tarmac surface
201	2	6	deposit	layer	make-up for surface [200]
202	2	6	deposit	fill	fill of [208]
203	2	6	deposit	fill	fill of [208]
204	2	6	deposit	fill	fill of [208]
205	2	6	deposit	fill	fill of [208]
206	2	6	deposit	fill	fill of [208]
207	2	6	deposit	fill	fill of [208]
208	2	6	cut	linear	intrusion
209	2	6	deposit	layer	levelling dump
210	2	6	deposit	layer	spread
211	2	6	deposit	layer	spread
212	2	6	deposit	layer	spread
213	2	3	deposit	layer	occupation deposit
214	2	3	deposit	layer	occupation deposit
215	2	2	deposit	layer	developed soil
216	2	6	deposit	layer	demolition dump
217	2	4	masonry	structure	brick structure, comprising walls [218] [219] and [220] & brick piers [221] and [226]
218	2	4	masonry	wall	NE wall of Structure [217]
219	2	4	masonry	wall	NW wall of Structure [217]
220	2	4	masonry	wall	SW wall of Structure [217]
221	2	4	masonry	pier	brick pier attached to wall [218]
222	2	4	masonry	wall	part of SE wall of Structure [236]
223	2	4	masonry	wall	part of NW wall of Structure [236]
224	2	4	masonry	wall	Part of SE wall of Structure [236]
225	2	4	masonry	wall	part of NW wall of Structure [236]
226	2	4	masonry	pier	brick pier attached to wall [220]
227	2	4	timber	beam	part of Structure [236]
228	2	4	timber	beam	part of Structure [236]
229	2	4	deposit	fill	fill of Structure [236]
230	2	4	deposit	fill	fill of Structure [236]
231	2	3	deposit	layer	spread of industrial waste
232	2	4	masonry	capping	possible capping of Structure [236]
233	2	6	deposit	fill	fill of [234]
234	2	6	cut	linear	service trench
235	2	4	deposit	fill	primary fill of Structure [236]
236	2	4	masonry	structure	structure comprising walls [222], [223], [224] and [225] & timbers [227] and [228]
237	2	4	deposit	fill	fill of [238]
238	2	4	cut	linear	construction trench for wall [225]
239	2	6	deposit	fill	fill of [241]
240	2	6	deposit	fill	fill of [241]
241	2	6	cut		intrusion
242	VOID				
243	2	3	deposit	layer	occupation layer
244	2	3	deposit	layer	occupation layer
245	2	3	deposit	layer	occupation layer
246	2	3	deposit	layer	occupation layer
247	2	6	deposit	fill	fill of [208]

Context	*Trench*	*Phase*	*Type 1*	*Type 2*	*Interpretation*
248	2	6	deposit	fill	fill of [208]
249	2	6	deposit	fill	fill of [208]
250	2	1	deposit	natural	natural sand and gravel
251	2	4	deposit	layer	occupation layer
252	2	3	deposit	layer	occupation layer
253	2	4	cut	linear	construction trench for wall [224]
254	2	4	deposit	fill	fill of [253]
255	2	2	deposit	fill	fill of [256]
256	2	2	cut	discrete	posthole
257	2	2	deposit	fill	fill of [258]
258	2	2	cut	discrete	posthole
259	2	2	deposit	fill	fill of [260]
260	2	2	cut	discrete	posthole
261	2	6	deposit	fill	fill within Structure [217]
262	2	6	deposit	fill	fill within Structure [217]
263	2	6	deposit	fill	fill within Structure [217]
264	2	6	deposit	fill	fill within Structure [217]
265	2	6	deposit	fill	fill within Structure [217]
266	2	6	deposit	fill	fill within Structure [217]
267	2	6	deposit	fill	fill within Structure [217]
268	2	6	deposit	fill	fill within Structure [217]
269	2	6	deposit	fill	fill within Structure [217]
270	2	2	cut	discrete	posthole
271	2	2	deposit	fill	fill of [270]
272	2	2	cut	discrete	posthole
273	2	2	deposit	fill	fill of [271]
274	2	4	timber		part of Structure [217]
275	2	4	deposit	fill	fill of cavity in pier [221] and wall [220]
276	2	4	deposit	fill	fill of [279]
277	2	4	deposit	fill	fill of [279]
278	2	4	deposit	fill	fill of [279]
279	2	4	cut	linear	construction cut for Structure [217]
280	2	3	deposit	layer	occupation layer
281	2	4	other	structure	steel rod within pier [221]
282	2	4	other	structure	steel rod within wall [220]
283	2	6	deposit	layer	tarmac surface
284	2	6	deposit	layer	deposit overlying [232]
300	3	6	deposit	layer	tarmac surface
301	3	6	deposit	layer	make-up for surface [300]
302	3	6	deposit	layer	infill/levelling dump
303	3	6	deposit	layer	infill/levelling dump
304	3	6	deposit	layer	infill/levelling dump
305	3	6	deposit	layer	infill/levelling dump
306	3	6	deposit	layer	infill/levelling dump
307	3	6	deposit	layer	infill/levelling dump
308	3	6	deposit	layer	infill/levelling dump
309	3	6	deposit	layer	infill/levelling dump
310	3	6	deposit	layer	infill/levelling dump
311	3	6	deposit	layer	infill/levelling dump
312	3	6	deposit	layer	infill/levelling dump
313	3	6	deposit	layer	infill/levelling dump
314	3	6	deposit	layer	infill/levelling dump
315	3	6	deposit	layer	infill/levelling dump
316	3	6	deposit	layer	infill/levelling dump
317	3	6	deposit	layer	infill/levelling dump
318	3	6	deposit	layer	infill/levelling dump
319	3	6	deposit	layer	infill/levelling dump
320	3	6	deposit	layer	infill/levelling dump
321	3	6	deposit	layer	infill/levelling dump
322	3	6	deposit	layer	infill/levelling dump
323	3	6	deposit	layer	infill/levelling dump
324	3	6	deposit	layer	infill/levelling dump
325	3	6	deposit	layer	infill/levelling dump
326	3	6	deposit	layer	infill/levelling dump
327	3	6	deposit	layer	infill/levelling dump
328	3	6	deposit	layer	infill/levelling dump
329	3	6	deposit	layer	infill/levelling dump
330	3	6	deposit	layer	infill/levelling dump

Context	*Trench*	*Phase*	*Type 1*	*Type 2*	*Interpretation*
331	3	1	deposit	natural	natural sand and gravel
400	4	6	deposit	layer	tarmac surface
401	4	6	deposit	layer	concrete slab
402	4	6	deposit	layer	infill/levelling dump
403	4	6	deposit	layer	infill/levelling dump
404	4	6	deposit	layer	infill/levelling dump
405	4	6	deposit	layer	infill/levelling dump
406	4	6	deposit	layer	infill/levelling dump
407	4	6	deposit	layer	infill/levelling dump
408	4	6	deposit	layer	infill/levelling dump
409	4	6	deposit	layer	infill/levelling dump
410	4	1	deposit	natural	natural sand and gravel
500	5	6	deposit	layer	concrete floor slab
501	5	6	deposit	fill	fill of [504]
502	5	6	deposit	fill	fill of [504]
503	5	6	deposit	fill	fill of [504]
504	5	6	cut	intrusion	intrusion
505	5	6	deposit	layer	infill/levelling dump
506	5	6	deposit	fill	fill of [508]
507	5	6	deposit	fill	fill of [508]
508	5	6	cut	intrusion	intrusion
509	5	6	deposit	fill	fill of [513]
510	5	6	deposit	fill	fill of [513]
511	5	6	deposit	fill	fill of [513]
512	5	6	deposit	fill	fill of [513]
513	5	6	cut	intrusion	intrusion
514	5	6	deposit	layer	demolition dump
515	5	6	deposit	layer	demolition dump
516	5	4	masonry	pier	brick pier base
517	5	4	deposit	layer	make-up for [518]
518	5	4	masonry	pier	sandstone pier base
519	5	3	deposit	floor	slag surface
520	5	3	deposit	layer	spread of industrial waste
521	5	3	deposit	floor	slag surface =[519]
522	5	3	deposit	layer	occupation deposit
523	5	2	deposit	layer	developed soil
524	5	1	deposit	natural	natural sand and gravel
525	VOID				
526	5	6	deposit	fill	fill of [527]
527	5	6	cut	linear	service trench
528	5	6	deposit	layer	infill/levelling dump
529	5	4	deposit	fill	fill of [530]
530	5	4	cut	discrete	construction cut for [516]
600	6	6	deposit	layer	concrete floor slab
601	6	6	deposit	layer	make-up for slab [600]
602	6	6	deposit	layer	demolition dump
603	6	6	deposit	layer	demolition dump
604	6	6	deposit	layer	infill/levelling dump
605	6	6	deposit	layer	infill/levelling dump
606	6	6	deposit	layer	infill/levelling dump
607	6	6	deposit	layer	infill/levelling dump
608	6	6	deposit	layer	infill/levelling dump
609	6	6	deposit	layer	infill/levelling dump
610	6	6	deposit	layer	infill/levelling dump
611	6	6	deposit	layer	infill/levelling dump
612	6	6	deposit	fill	fill of [630]
613	6	6	deposit	fill	fill of [630]
614	6	6	deposit	fill	fill of [630]
615	6	6	deposit	fill	fill of [630]
616	6	6	deposit	fill	fill of [630]
617	6	6	deposit	fill	fill of [630]
618	6	6	deposit	layer	infill/levelling dump
619	6	6	deposit	layer	occupation deposit
620	6	6	masonry	wall	brick wall
621	6	6	deposit	fill	fill of [668]
622	6	6	deposit	fill	fill of [668]
623	6	6	deposit	fill	fill of [668]
624	6	6	deposit	fill	fill of [668]

Context	*Trench*	*Phase*	*Type 1*	*Type 2*	*Interpretation*
625	6	6	deposit	fill	fill of [668]
626	6	4	deposit	layer	compact ballast
627	6	4	deposit	layer	compact ballast
628	6	6	deposit	layer	ballast
629	6	5	deposit	layer	compact ballast
630	6	6	cut	?linear	terracing' cut/intrusion
631	6	6	deposit	layer	ash dump
632	6	6	deposit	fill	fill of [670]
633	6	6	deposit	fill	fill of [670]
634	6	6	deposit	layer	mortar dump
635	6	5	masonry	structure	brick structure comprising walls [659], [660], [661], [662] and [663]
636	6	6	deposit	layer	demolition dump
637	6	6	deposit	fill	fill of [630]
638	6	6	deposit	fill	fill of [630]
639	6	6	deposit	fill	fill of [630]
640	6	6	deposit	fill	fill of [630]
641	6	6	deposit	layer	infill/levelling dump
642	6	6	deposit	layer	infill/levelling dump
643	6	6	deposit	layer	infill/levelling dump
644	6	6	deposit	fill	fill of [630]
645	6	6	deposit	fill	fill of [630]
646	6	6	deposit	fill	fill of [630]
647	6	6	deposit	layer	infill/levelling dump
648	6	6	deposit	fill	fill of [630]
649	6	6	deposit	fill	fill of [630]
650	6	6	masonry	wall	wall, ?part of culvert/flue
651	6	6	deposit	fill	fill of [630]
652	6	5	deposit	layer	spread
653	6	6	deposit	fill	fill of [668]
654	6	6	deposit	fill	fill of [672]
655	6	6	deposit	fill	fill of [672]
656	6	6	deposit	layer	spread of industrial waste
657	6	6	deposit	layer	spread =[656]
658	VOID				
659	6	5	masonry	wall	part of Structure [635]
660	6	5	masonry	wall	part of Structure [635]
661	6	5	masonry	wall	part of Structure [635]
662	6	5	masonry	wall	part of Structure [635]
663	6	5	masonry	wall	part of Structure [635]
664	6	5	masonry	foundation	foundation of wall [659]
665	6	5	deposit	layer	mortar spread
666	6	6	deposit	fill	fill of [667]
667	6	6	cut	linear	service trench
668	6	6	cut	linear	intrusion
669	6	4	deposit	floor	surface associated with Structure [635]
670	6	6	cut	?linear	intrusion
671	6	6	deposit	layer	infill/levelling dump
672	6	6	cut	?linear	cut associated with robbing of wall [663]
673	6	5	masonry	foundation	foundation of wall [660]
674	6	6	deposit	fill	fill of [630]

APPENDIX C
PLATES

Plate 1. Trench 1. General view, looking north-east *(2m scale)*

Plate 2. Trench 1. Wall [105] and Floor [116], overview *(1m scale).*

Plate 3. Trench 2. South-west facing section (Section 2), looking north-east *(2m scale)*

Plate 4. Trench 2. North-eastern arm, general view, looking north-east *(2m and 1m scales)*

Plate 5. Trench 2. Structure [217], looking north-east *(2m horizontal & 1m vertical scale)*

Plate 6. Trench 2. Structure [236], looking south-west *(1m scale)*

Plate 7. Trench 2. Structure [217], interior, looking south-east *(1m horizontal & 2m vertical scale)*

Plate 8. Trench 2: Wall [220], detail, looking south *(0.5m scale)*

Plate 9. Trench 3. General view, looking south-west *(2m scale)*

Plate 10. Trench 4. General view, looking south-east *(2m scale)*

Plate 11. Trench 5. General view, looking south-west *(1m scale)*

Plate 12. Trench 6. General view, looking east *(1m scale)*

Plate 13. Trench 6. General view, looking west *(1m scale)*

Plate 14. Trench 6. Structure [635], overview *(1m scale)*

Plate 15. Trench 6. Ballast [629] showing position of rail, looking north-east *(1m scale)*

APPENDIX D
FINDS REPORT

FINDS REPORT

By **Jenny Vaughan and John Nolan (Northern Counties Archaeological Services)**

Introduction

Pottery sherds, ceramic building material, clay tobacco pipe fragments and glass artefacts were recovered during the evaluation at Hawks Road. The material was examined to provide dating evidence and for its potential for further analysis.

Pottery

Six contexts produced 49 sherds of pottery. Sherds ranged in date from the medieval period (13th/14th century) to the 19th century. The assemblage is catalogued below. In terms of condition, the medieval sherds were particularly abraded but in general the later sherds were relatively 'fresh'.

Pottery Catalogue

Context	Type	Sherds (No.)	Comments	Date
111	creamware	1		early 19th c.?
111	later black glazed redware	1		
111	later redware	1	With slip	
111	refined whiteware	1	Shell edge flatware rim	early 19th c.?
111	refined whiteware	2	Ring base with some blue painting	
214	creamware	3		18th/early 19th c.?
214	later redware	1	With slip	
214	medieval	1	Jar rim in oxidised fabric	13th/14th c.
214	post-medieval whiteware	1	Rolled dish rim - some yellow and green glaze	17th c.
215	medieval	5	Abraded rod handle in light orange fabric with traces of glaze and incised lines. One sherd of worn reduced greenware, one of a buff/pink fabric. Two others small.	13th/14th c.
215	post-medieval?	2	These may be post medieval (*i.e.* 16th/17th c.) rather than medieval	
215	redware	3	Small base, one fragment is sooted. Glazed internally	17th c.
215	redware	2	Dish rim, burnt/discoloured and flaked but seems to have a trace of slip decoration. Other sherd ? Same vessel	17th c.
237	later redware	1	With slip trailed decoration	18th/19th c.
268	later redware	1	With slip	
268	refined whiteware	10	Pearlware? - has blue tint to glaze. Profile of bowl - ring base, simple rim - with mixed colour slip circles (not quite 'cat's eye')	early 19th c.?
268	refined whiteware	1	Pearlware? Out turned dish rim with row of beads along upper edge.	
273	medieval	1	Abraded - ?partly oxidised reduced greenware.	early 14th c.?
639	refined whiteware	1	Profile of bowl on ring base. Purple border pattern and three green lines. Border seems too even to be cut sponge.	19th c.
639	coarse stoneware	1	Large stopper-like object - perhaps lid for an industrial vessel of some type.	
640	utilitarian stoneware	2	Large brown glazed jar base with impressed maker's mark. DOULTON & CO LIMITED/LAMBETH with '8' between.	19th c.

Pottery Discussion

The pottery assemblage from the evaluation is too small to have any potential for further analysis, but the presence of the material and its condition suggest further work at the site might produce some interesting groups of material.

Other Finds

Context [215] produced three abraded lumps of probably ceramic building material which are undateable.

Six clay pipe stems, one complete bowl and eight joining fragments of another were also recovered. One of the stems and the bowl were from context [246] which did not produce any other finds. The bowl was of late 17th/early 18th century date (*i.e. c.* 1680 to 1710). The other stems were from contexts [111] (2), [214] (2) and [215] (1). The large bore of the stem from context [215] is consistent with the 17th century date suggested by the red earthenware in this context. The eight joining fragments were from context [639], and represented a late 19th century large briar copy type bowl. Part of a stem mark was visible - '…HEAD' - so this was almost certainly a Gateshead maker, but unfortunately the name was missing.

The base of a large green bottle came from context [268]. It is probably of 19th century date.

Five brick samples were taken from Structures [217] and [236] within Trench 2. All of the bricks were consistent with a date early in the latter half of the 19th century, as proposed for the structures. Measurements are given in the table below.

The brick taken from the north-eastern wall, [218], of Structure [217] was handmade, of a mid red fabric and unfrogged. The surfaces of the brick were coated in a light yellow wash. All but one side had remnants of grey lime mortar.

The brick sample from the north-western wall, [219], of Structure [217] was a key firebrick, of a pale yellow/buff fabric with occasional black inclusions. On one side of the brick there was a rectangular frog measuring 151mm by 31mm by 3mm, stamped 'LINTZ'. The letters of the stamp were deeply incised (*c*. 5mm). The stamp indicates that the brick was manufactured at Lintz Colliery near Burnopfield in County Durham. The brickworks at the colliery is recorded as being in operation between 1868 and 1924.

The sample from the south-eastern wall, [222], of Structure [236] was an unfrogged probable firebrick, and of a yellow/buff fabric, with hard, light whitish grey lime mortar adhering to all surfaces apart from one header end of the brick. The brick was stamped 'POTTE(R)', indicating that it was likely manufactured at Addison Potter's Firebrick Works, Walbottle and Willington Quay, operating from *c.* 1847-early 1880s

The sample from the north-eastern end of the north-western wall, [223], of the same structure was handmade, of a mid red fabric, and was sooted on all surfaces.

The partial brick taken from the south-western end of the north-west wall, [225], of Structure [236] was a firebrick, of pale yellow/buff fabric. The brick was not frogged, but was stamped on one side with the letters 'COW', likely representing part of a stamp of Cowen's brickworks in Blaydon, dating its manufacture to the period 1820-1901.

A brick sample was taken from brick pier [516] in Trench 5. It comprised a firebrick, in yellow/buff fabric. Soft grey lime mortar adhered to one side, which was discoloured by heat. The brick was stamped 'LINTZ' (see above).

Two bricks were taken from wall [660], part of the structure recorded in Trench 6. One was a wirecut common brick in a light-mid red fabric with occasional ironstone inclusions. The other was an arch firebrick, broken at one end, with measurements of 113mm in width, and 66mm maximum thickness, tapering to 48mm. The brick was in a yellow/buff gritty fabric, and stamped 'LINTZ' (see above).

Brick Catalogue

Context	*Phase*	*Length (mm)*	*Width (mm)*	*Thickness (mm)*	*Comments*
218	4	219	108	65	Handmade, red.
219	4	227	130	75	Key firebrick. Stamped 'LINTZ'.
222	4	-	113	65	Firebrick. Stamped 'POTTE(R)',
223	4	230	115	80	Handmade, red.
225	4	-	-	62	Firebrick. Stamped 'COW' ,
516	4	231	117	63	Firebrick. Stamped 'LINTZ'.
660	5	237	118	79	Common brick, wirecut.
660	5	-	113	66-48	Arch firebrick. Stamped 'LINTZ'.

APPENDIX E
SLAG AND INDUSTRIAL PROCESSES RESIDUES REPORT

SLAG AND INDUSTRIAL PROCESS RESIDUES REPORT

*By **Dr. R. Mackenzie***

Introduction

The following report is an archaeometallurgical assessment of slag and industrial process residues recovered during the evaluation on Hawks Road, Gateshead. The aim of the assessment has been to identify the slag and residues, and determine whether further analysis could provide additional information about the site, or specific processes carried out there. The slag and residues have been visually examined and the results of the assessment are described below.

Results

Context No.	***No. of pieces/volume***	***Wt (g)***	***Description of material***
267	c. 2.5 litres	4,500	Bulk sample largely composed of fragments of fuel ash slag and drossy cupola/blast furnace slag, small fragments of burnt coke, ash and earth/sand. Typical 19th to early/mid 20th century iron foundry debris.
268	c. 5 litres	7,700	Bulk sample largely composed of fine fragments fuel ash slag and possible metalliferous slag, small fragments of burnt coke and soot, ash and earth/sand. General foundry floor debris.
269	8 fragments	6,930	Similar composition to material in previous bulk sample [268], but compacted into solid. Possible compacted foundry floor material.
269	2 fragments	3,100	Drossy furnace slag. Probably from a cupola furnace.
269	1 fragment	150	Lump of partially burnt coke fuel.
515	4 fragments	3,600	Drossy furnace slag. Probably from a cupola furnace.
515	1 fragment	400	Piece of broken refractory brick with slagged surface.
656	2 fragments	6,600	Dense tap slag, dark graphite grey to black in colour, probable cupola furnace slag.

Table 1. Results of assessment of slag and industrial process residues

Discussion and Interpretation of Results

As one might expect from a former ironworks, the assemblage is predominated by residues relating to iron production. As well as general foundry floor type debris, two types of furnace slag are also present. The most diagnostic of these are the fragments of very dense, dark grey to black tap slag that is a common type produced by cupola furnaces. The colour of the tap slag suggests that the furnace was probably being run in an oxidising state, and the low vesicularity suggests good control over the amount of flux in the furnace charge. The flow pattern on the underside of some fragments strongly suggests that the slag was tapped into an earth/sand pit or channel in the foundry floor. The slag would have originally solidified into one piece, and this would have broken up during disposal; the fragmentary nature of the tap slag in the assemblage reflects this.

The other type of metallurgical slag present in the assemblage is a less dense ‘drossy’ furnace slag, which has the appearance of slag that was raked out of a coke fired furnace at the end of a firing. The morphology of the slag, together with presence of cupola furnace tap slag, suggests that the two types of slag probably originated from the same source.

Cupola furnaces were, and still are, used to melt iron, including scrap and cast iron, to produce iron castings. The furnace itself is a vertical cylinder lined with refractory material, and it is charged with alternating layers of fuel (coke), iron and flux (limestone). Reactions between the liquid iron, refractory lining, fuel and flux produce slag as a by-product. Metallurgical analysis of cupola slag can provide detailed information on the conditions within the furnace, although it should be borne in mind that this type of analysis may only provide a 'snap-shot' of furnace operating conditions, unless numerous specimens are analysed.

It is interesting to note that the historical records of Hawks' Iron Works mention it was a manufactory that was importing pig iron and bar iron, and producing castings and forgings. Cupola furnaces are exactly the type of furnace that would be employed for the melting down of pig iron to produce finished castings, and it therefore seems likely that the cupola slag found relates to this type of production activity at the site.

Recommendations

Given the type and archaeological contexts of the material in the assemblage, and what is already known about the site, further analysis of the material is not recommended at this stage.

APPENDIX F
PROJECT SPECIFICATION

Tyne and Wear Specialist Conservation Team

Specification for Preliminary Archaeological Evaluation at C.P.S. Haulage Ltd, Hawks Road, Saltmeadows, Gateshead NE8 3AD

Planning Application: DC/08/01288/FUL

Author:

Jennifer Morrison
Tyne and Wear Archaeology Officer
West Chapel
Jesmond Old Cemetery
Jesmond Road
Newcastle upon Tyne
NE2 1NL
Tel (0191) 2816117
jennifer.morrison@newcastle.gov.uk

Date: 10 June 2009

County Archaeologist's Reference Number: MON6670

The Tyne and Wear Specialist Conservation Team is the curatorial service for archaeology, industrial archaeology and historic buildings throughout the Tyne and Wear districts. It helps and advises Newcastle, Gateshead, North Tyneside, South Tyneside and Sunderland Councils to carry out their statutory duties to care for the precious historic environment of Tyneside and Wearside. The Team can be found at the Strategic Housing, Planning and Transportation Division of the Environment & Regeneration Directorate of

Newcastle City Council

Introduction

Site grid reference: NZ 2595 6379

Planning permission has been granted for a 6-7 storey hotel, a 4-5 storey office building, a new vehicular access to Hawks Road and 67 car parking spaces.

The site is to be reduced in level by 2m then built back up. The foundations will be 20m deep piles. Boreholes indicate a depth of up to 6m of made ground which could include archaeological remains.

There is a steep slope from the site down to Mill Road.

An archaeological desk based assessment was produced in March 2008 (Under Construction Archaeology).

The site lies outside the presumed extent of the Roman bridgehead settlement and the medieval town, but is within the presumed extent of the medieval Bishop's Park. Industries were set up in the 17th and 18th centuries in an area of the park known as Saltmeadows.

The site was developed in the 1747 as part of William Hawks New Greenwich Iron Works, which comprised a few blacksmith's shops. Hawks was a blacksmith and manager at Crowley's London warehouse at Greenwich. Hawks secured a supply of scrap iron from London. His Gateshead works were located between the Rock and Dock staiths on the Tyne, which would have aided the delivery of scrap iron and finished ironmongery goods such as shovels and spades. William Hawks died in 1755.

William Hawks II (died in 1810) expanded the works. By 1774 a small stream was employed to power the works. This stream fed the mill pond and dam which are shown on Charles Hutton's plan of Newcastle 1770. The stream ran along the western edge of the site, close to the modern Mill Road. A lease of 1795 states that a dam and reservoir had been constructed at the forge, mill and mill race. The mill pond is comma shaped and is crossed in the middle by a bridge or track. There is a wide fore-dam to the north and a narrow tail dam to the south. It is likely that the remains of the mill pond and dam lie within the site.

A ravine, possibly the stream or tail race was revealed during archaeological excavations at Kelvin Works (Tyne and Wear Museums, 2006). A mill race, pool and water course was also found at Sir Ambrose Crowley's iron works at Swalwell (Pre-Construct Archaeology Ltd, 2005). Excavations at both Kelvin Works and Ingersoll Rand, South Shore Road (Tyne and Wear Museums, 2007) recorded substantial remains of other parts of Gateshead Iron Works.

Thomas Oliver's plan of 1830 shows only a small rectangular remnant of the dam survived. A plan and lease of the late 1830s does not show the dam at all – presumably it had been in-filled. Steam engines had been installed from 1790 onwards.

The Gateshead Irons Works continued to expand and innovate. A chain testing house was built by 1812 and Nasmyth's Patent Steam Hammers were used by the mid 19th century.

The Ordnance Survey first edition map shows the site to be an open yard within Gateshead Iron Works bisected by a railway. The second edition map shows an 'old shaft' which must be avoided by the trenches.

By the mid 19th century the company became Hawks Crawshay and Sons. It specialised in heavy engineering, bridges (included the High Level Bridge), iron and steel for shipbuilding, piles and ironwork for lighthouses and piers and steam engines.

In the 1880s the anchor smith's bellows were worked by horse power.

It is believed that the company went into liquidation in 1889 because they failed to specialise like their competitors. The site remained vacant for much of the early 20th century.

The appointed archaeologist must familiarise themselves with the results of these reports before starting work.

In accordance with PPS5 and UDP Policies ENV21 and ENV22 a programme of archaeological evaluation is required to ascertain if remains such as the iron works pond, dam or buildings survive.

Research Aims and Objectives

The evaluation report should make reference to Regional and Thematic Research Frameworks.

'Shared Visions: The North-East Regional Research Framework for the Historic Environment' by David Petts with Christopher Gerrard, 2006 notes the importance of research as a vital element of development-led archaeological work. It sets out key research priorities for all periods of the past allowing commercial contractors to demonstrate how their fieldwork relates to wider regional and national priorities for the study of archaeology and the historic environment. The aim of NERRF is to ensure that all fieldwork is carried out in a secure research context and that commercial contractors ensure that their investigations ask the right questions.

See Resource Assessment Post Medieval (pages 96-98 and 99-100)
Research Agenda Post Medieval (pages 177-178)
Key research priorities PMii, PMviii

See http://www.algao.org.uk/Association/England/Regions/ResFwks.htm

Ideally and where possible the evaluation should cross-reference its aims and objectives to national priorities, defined in SHAPE (Strategic Frameworks for Historic Environment Activities and Programmes in English Heritage), and the English Heritage Research Agenda 2005-2010.

Where appropriate note any similar nationwide projects using ADS, internet search engines, ALSF website, HEEP website, OASIS, NMR excavation index.

All staff on site must understand the project aims and methodologies.

Methods statement

Four evaluation trenches are needed to inform the Planning Authority of the character, nature, date, depth, degree of survival of archaeological deposits on this site. The excavation must be carried out by a suitably qualified and experienced archaeological organisation. The work will record and environmentally sample any archaeological deposits of importance found on the plot. The purpose of this brief is to obtain tenders for this work. The report must be the definitive record for deposition in the Tyne and Wear HER, and it must contain recommendations for any further archaeological work needed on this site.

The commissioning client needs to be aware that the purpose of the preliminary evaluation is merely to ascertain if archaeological remains survive on this site and if they do, to determine their broad date, nature and function. Where archaeological remains are found in the preliminary trenches, and if these remains are at threat by the proposed development, further archaeological excavation and or a watching brief will be required before and during development work.

All staff employed by the Archaeological Contractor shall be professional field archaeologists with appropriate skills and experience to undertake work to the highest professional standards.

The work will be undertaken according to English Heritage Guidelines - Managing Archaeological Projects 2nd Edition ('MAP2') 1991 (www.english-h.gov.uk/guidance/map2/index.htm) and Management of Research Projects in the Historic Environment (MoRPHE) – The MoRPHE Project Managers' Guide, Project Planning Notes and Technical Guides 2006 (www.english-heritage.org.uk/publications).

The work will be undertaken according to MoRPHE Project Planning Notes 2006 - PPN3 – Archaeological Excavation and PPN6 – Development of Procedural standards and guidelines for the historic environment.

All work must be carried out in compliance with the codes of practice of the Institute of Field Archaeologists and must follow the IFA Standard and Guidance for Archaeological Field Evaluations, Excavation or Watching Briefs as appropriate. www.archaeologists.net

Notification

The County Archaeologist needs to know when archaeological fieldwork is taking place in Tyne and Wear so that he can inform the local planning authority and can visit the site to monitor the work in progress. The Archaeological Contractor must therefore inform the County Archaeologist of the start and end dates of the Evaluation. He must also keep the County

Archaeologist informed as to progress on the site. The CA must be informed of the degree of archaeological survival and of any significant finds. The Client will give the County Archaeologist reasonable access to the development to undertake monitoring.

PROJECT INITIATION

PROJECT DESIGN

Because this is a detailed specification, the County Archaeologist does **not** require a Project Design from the appointed archaeologist. The appointed archaeologist is expected comply with the requirements of this specification.

HEALTH AND SAFETY AND RISK ASSESSMENT

A health and safety statement and risk assessment, identifying potential risks in a risk log (see template in appendix 2 of The MoRPHE Project Manager's Guide) and specifying suitable countermeasures and contingencies, is required to be submitted to the commissioning client.

The Client may wish to see copies of the Archaeological Contractor's Health and Safety Policies.

The Archaeological Contractor must maintain a Site Diary for the benefit of the Client, detailing the nature of work undertaken on a day by day basis, with full details of Site Staff present, duration of time on site, etc. and contact with third parties.

The Management of Research Projects in the Historic Environment (MoRPHE) – The MoRPHE Project Managers' Guide 2006 contains general guidance on Risk management (section 2.3.2, Appendix 2).

Risk assessments must be produced in line with legislative requirements (for example the Health and Safety at Work Act 1974, the Management of Health and Safety at Work Regulations 1999, the Control of Substances Hazardous to Health (COSHH) Regulations 2002 and the Personal Protective Equipment at Work Regulations 2002) and best practice e.g. as set out in the FAME (Federation of Archaeological Managers & Employers) formerly SCAUM (Standing Conference on Archaeological Unit Managers) Health and Safety Manual
www.famearchaeology.co.uk
www.scaum.org/uk

The Risk Assessment will identify what PPE (hard hats, glasses/goggles, steel toe cap and instep boots, gloves, high-viz clothing etc) is required.

Other potentially applicable legislation:

Working at Heights Regulations 2005, Manual Handling 1992

'Safe use of ladders and stepladders: An employers' guide' HSE Books 2005

Some archaeological work (such as those that last more than 30 days or involve more than 500 person days) may be deemed notifiable projects under C.D.M Regulations 1994 (amended 2007). Where C.D.M Regs apply, the HSE must be notified. A CDM Co-ordinator and principal contractor must be appointed. The CDM-C will produce a Health and Safety file. The PC will prepare the Construction Phase Plan. The HSE website includes a Power Point presentation on CDM training.

Detailed information on hazards and how to carry out a risk assessment can be obtained from the Health and Safety Executive (www.hse.gov.uk) and the local authority health and safety department.

Specific guidance for land contamination and archaeology can be obtained from the Institute for Archaeologists (www.archaeologists.net), the Construction Industry Research and Information Association (www.contaminated-land.org) and the Association of Geotechnical and Geoenvironmental Specialists (www.ags.org.uk).

See also Environment Agency, 2005 “Guidance on Assessing the Risk Posed by Land Contamination and its Remediation on Archaeological Resource Management”.

The Archaeological Contractor must be able to provide written proof that the necessary levels of Insurance Cover are in place.

The Archaeological Contractor must detail measures taken to ensure the safe conduct of excavations, and must consult with the client's structural engineers concerning working in close proximity to the foundations of the surrounding buildings.

Excavation trenches should:

- Be protected from vehicles and guarded off for pedestrians
- not have steep sides or must be shored
- have good access and egress

The archaeologists must not work near overhead power lines.

Underground services can be easily damaged during excavation work. If proper precautions are not taken, it is all too easy for workers to hit these services resulting in a risk of

- heat, flame and molten metal from electric cables
- escaping gas from gas pipes
- flooding of the excavation when a water pipe is damaged
- interruption of services

Excavation work in the public highway, kerbside or pavement can only be undertaken by those with a Street Works certificate of competence. Before the excavation takes place the person supervising the digging must have been given service plans and be trained in how to read them. All persons involved in the excavation must know about safe digging practice and emergency procedures. A locator must be used to trace the line of any pipe or cable or to confirm that there

are no pipes or cables in the way. The ground will be marked accordingly. There must be an emergency plan to deal with damage to cables and pipes.

PROJECT EXECUTION

1) Archaeological evaluation

The appointed archaeological contractor will draw up a suggested trench location plan for approval by the County Archaeology Officer, taking all of the site hazards into consideration, whilst still evaluating the mill pond and dam, the railway and some of the buildings shown in the map regression.

The dimensions of the four trenches are each 2m x 20m in plan **at base**.

Trench locations can be adjusted to avoid services or for practical or safety purposes.

Trenches can be widened if feasible in order to step the sides to reach depths over 1.2m where necessary, otherwise shoring will be required.

Trenches must avoid known services.

Trenches must avoid the 'old shaft' shown on Ordnance Survey maps.

Trenches must stay a safe distance away from pylons and overhead power lines.

The commissioning client will advise of any ecological or biodiversity issues which need to be taken into consideration.

The commissioning client will advise of any protected trees which must be avoided by the evaluation. Damage to trees covered by a Tree Protection Order carries a substantial fine.

Trench positions should be accurately surveyed prior to excavation and tied in to the national grid.

Ideally the trenches should be excavated to the depth of natural subsoil if this could be reached safely. However boreholes show up to 6m of made ground on this site. Trenches are not expected to be dug any deeper than 3m for safety reasons.

Tasks

Hand excavation, recording and environmental sampling (as stipulated below) of deposits down to the depth specified above.

Any modern overburden or levelling material can be machined-off using a wide toothless ditching bucket under strict archaeological supervision and the remaining deposits are to be excavated by hand.

All faces of the trench that require examination or recording will be cleaned.

Excavation is to be carried out with a view to avoid damage to any archaeological features which appear to worthy of preservation in-situ.

Excavation is to be carried out by single context planning and recorded on *pro forma* context sheets. Features over 0.5 m in diameter can be half sectioned.

Environmental sampling (and where relevant scientific dating) are compulsory parts of the evaluation exercise. All tenders will give a price for the assessment, full analysis, report production and publication per environmental and scientific dating sample as a contingency.

Samples will be taken of bricks from any brick-built structures. The dimensions of the bricks and the type of bonding must be recorded.

An expert on the iron industry should be brought into the project where remains survive.

Scientific investigations should be undertaken in a manner consistent with "The Management of Archaeological Projects", English Heritage 1991 and with "Archaeological Science at PPG16 Interventions: Best Practice for Curators and Commissioning Archaeologists", English Heritage, 2003. Advice on the sampling strategy for environmental samples and samples for scientific dating etc. must be sought from Jacqui Huntley, English Heritage Regional Advisor for Archaeological Science (jacqui.huntley@english-heritage.org.uk or 07713 400387) **before** the evaluation begins. See Appendix 1 for more information.

See Appendix 2 for guidance on procedures relating to human remains.

See Appendix 4 for guidance on Treasure Act procedures.

The spoil can be kept close-by and rapidly backfilled into the trenches at the conclusion of this work.

Recording

A full written, drawn (accurate scale plans, elevations and section drawings) and photographic record (of all contexts in **either** black and white print and colour transparency **or** with a digital camera) will be made. All images must include a clearly visible graduated metric scale.

All photographs forming part of the record should be in sharp focus, with an appropriate depth of field. They should be adequately exposed in good natural light or, where necessary, sufficiently well-lit by artificial means.

Use of digital cameras

Use a camera of 5 megapixels or more.

For maximum flexibility digital Single Lens Reflex cameras offer the best solution for power users. 6 megapixels should be considered a minimum requirement.

When photographing with digital SLR cameras, there is often a magnifying effect due to smaller sensor sizes.

If the JPEG (Joint Photographic Experts Group) setting is used, set the camera for the largest image size with least compression. The JPEG format discards information in order to reduce file size. If the image is later manipulated, the quality will degrade each time you save the file.

For maximum quality, **the preferred option** is that the RAW (camera-specific) setting is used. This allows all the information that the camera is capable of producing to be saved. Because all of the camera data is preserved, post processing can include colour temperature, contrast and exposure compensation adjustments at the time of conversion to TIFF (Tagged Interchangeable File Format), thereby retaining maximum photographic quality.

The RAW images must be converted to TIFF before they are deposited with the HER and TWAS because special software from the camera manufacturer is needed to open RAW files.

Uncompressed formats such as TIFF are preferred by most archives that accept digital data.

Post photography processing:

The submitted digital images must be 'finished', ready to be archived.

Post photography processing workflow for RAW images:

1 Download images
2 Edit out unwanted shots & rotate
3 Batch re-number
4 Batch caption
5 Batch convert to TIFF
6 Edit in Photoshop or similar
7 Save ready to burn to CD
8 Burn to CD
9 Dispatch

Batch caption – the image files should be named to reflect their content, preferably incorporating the site or building name. Consistent file naming strategies should be used. It is good practice not to use spaces, commas or full stops. For advice, go to http://ads.ahds.ac.uk/project/userinfo/deposit.html#filenaming . In order to find images at a future date and for copyright the site or building name, photographer's name and/or archaeological unit etc must be embedded in the picture file. The date can be appended from the EXIF data. Metadata recording this information must be supplied with the image files. A list of images, their content and their file names should be supplied with the image files on the CDs.

Batch conversion to TIFF – any white balance adjustments such as 'daylight' or 'shade' be required then this can be done as part of the conversion process. Ensure that any sharpening settings are set to zero.

Edit in 'Imaging' software such as Photoshop – tonal adjustments (colour, contrast) can be made. Rotate images where necessary, crop them to take out borders, clean the images to remove post-capture irregularities and dust. Check for sensor dust at 100% across the whole image.

Save ready for deposit – convert to TIFF and save. Retain the best colour information possible – at least 24 bit.

If the JPEG setting has been used and the image has been manipulated in any way it should be saved as a TIFF to prevent further image degradation through JPEGing.

Burn to CD – the NMR recommends using Gold CDs. Use an archive quality disk such as MaM-E gold. Gold disks have a lower burn speed than consumer disks.

Disks should be written to the 'Single Session ISO9660 – Joliet Extensions' standard and not UDF/Direct CD. This ensures maximum compatibility with current and future systems.

Images should be placed in the root directory not in a folder.

The CD will be placed in a plastic case which is labelled with the site name, year and name of archaeological contractor.

For more guidance on digital photography:

Digital Imaging Guidelines by Ian Leonard, Digital Archive Officer, English Heritage 22 September 2005)

Understanding Historic Buildings – A guide to good recording practice, English Heritage, 2006

Duncan H. Brown, 2007, "Archaeological Archives – A guide to best practice in creation, compilation, transfer and curation"

IFA, Guidance on the use and preservation of digital photographs

FISH (Forum on Information Standards in Heritage), September 2006 v.1, A Six Step Guide to Digital Preservation, FISH Fact Sheet No. 1

Visual Arts Data Service and Technical Advisory Service for Images, Creating Digital Resources for the Visual Arts: Standards and Good Practice http://vads.ahds.ac.uk/guides/creating_guide/contents.html

AHDS Guides to Good Practice – Julian Richards and Damian Robinson (eds), Digital Archives from Excavation and Fieldwork: Guide to Good Practice, Second Edition

Printing the images:

In view of the currently unproven archival performance of digital data it is always desirable to create hard copies of images on paper of archival quality.

A selection of the images will be printed in the finished report for the HER at high quality on photo quality paper, two images per A4 page.

When preparing files for printing, a resolution of 300dpi at the required output size is appropriate.

A full set of images will also be professionally printed in black and white and colour for submission as part of the site archive.

Use processing companies that print photos to high specifications. Commercial, automatic processing techniques do not meet archival standards and must not be used.

All prints for the archive must be marked on the back with the project identifier (e.g. site code) and image number.

Store prints in acid-free paper enclosures or polyester sleeves (labelled with image number)

Include an index of all photographs, in the form of running lists of image numbers

The index should record the image number, title and subject, date the picture was taken and who took it

The print sleeves and index will either be bound into the paper report or put in an A4 ringbinder which is labelled with the site name, year and archaeological unit on its spine.

Plans and drawings

The finished report must include a plan and section of each trench (even where no archaeological remains are recorded) plus plans and sections through excavated archaeological features.

The plans will include at least two site grid points and will show section line end points.

The plans will depict building material (i.e. brick and stone) where a complex of structures has been found.

Where there is a complex of interlocking multi-phased structures, a phasing plan will also be included.

There will be elevation drawings of any standing structures such as walls.

Pro-forma context sheets will be used.

All deposits and the base of the trench will be levelled. Levels will be expressed as metres above Ordnance Datum.

Stratigraphy shall be recorded even when no archaeological features have been recognised.

A 'Harris' matrix will be compiled where stratified deposits are recorded.

2) Post-excavation and report production

Finds Processing and Storage

The Archaeological Contractor will process and catalogue the finds in accordance with Museum and Galleries Commissions Guidelines (1992) and the UKIC Conservation Guidelines, and arrange for the long term disposal of the objects on behalf of the Client. A catalogue of finds and a record of discard policies, will be lodged with the finds for ease of curation.

Finds shall be recorded and processed in accordance with the IFA Guidelines for Finds Work

Finds will be assessed by an experienced finds specialist.

See 'Investigative Conservation. Guidelines on how the detailed examination of artefacts from archaeological sites can shed light on their manufacture and use', English Heritage, 2008.

Human and animal bone assemblages should be assessed by a recognised specialist (see Appendices 2 and 3 for more information).

Industrial slag and metal working debris will be assessed by a specialist.

Assessment should include x-radiography of all iron objects (after initial screening to exclude recent debris) and a selection of non-ferrous artefacts (including all coins). Refer to "Guidelines on the x-radiography of archaeological metalwork, English Heritage, 2006.

Brick dimensions will be measured and a note made of the bonding material.

If necessary, pottery sherds and bricks should be recommended for Thermo-luminescence dating. See 'Luminensence Dating: guidelines on using luminescence dating in archaeology', English Heritage, 2008.

Inductively-coupled plasma spectroscopy (ICPS) and thin sectioning can be used to establish the chemical composition of clay fabric (pottery), which helps to locate production sites and identify the products of known sites.

Finds processing, storage and conservation methods must be broadly in line with current practice, as exemplified by the IFA "Standard and guidance for the collection, documentation, conservation and research of archaeological materials", 2001. Finds should be appropriately packaged and stored under optimum conditions, as detailed in the RESCUE/UKIC publication "First Aid for Finds" (Watkinson and Neal 1998). Proposals for ultimate storage of finds should follow the UKIC publication "Guidelines for the Preparation of Excavation Archives for Long-term Storage" (Walker 1990). Details of methodologies may be requested from the Archaeological Contractor.

Other useful guidance – "A Strategy for the Care and Investigation of Finds", English Heritage, 2003, "Finds and Conservation Training Package", English Heritage, 2003.

All objects must be stored in appropriate materials and conditions to ensure minimal deterioration. Advice can be sought from Jacqui Huntley of English Heritage (07713 400387) where necessary.

PRODUCTS

The report

1. The Archaeological Contractor must produce an interim report of 200 words minimum, **two weeks after the completion of the field-work**, for the Client and the Planning Authority, with a copy for information to the County Archaeologist. This will contain the recommendations for any further work needed on site.

2. The production of Site Archives and Finds Analysis will be undertaken according to English Heritage Guidelines - Managing Archaeological Projects 2nd Edition ('MAP2') 1991 and Management of Research Projects in the Historic Environment (MoRPHE) 2006.

3. A full archive report or post-excavation assessment, with the following features should be produced **within six months of the completion of the field-work**. All drawn work should be to publication standard. The report must include:

* Location plans of trenches and grid reference of site
* Site narrative – interpretative, structural and stratigraphic history of the site
* Plans showing major features and deposit spreads, by phase, and section locations
* Sections of the two main trench axes and through excavated features with levels
* Elevation drawings of any walls etc. revealed during the excavation
* Artefact reports – full text, descriptions and illustrations of finds
* Tables and matrices summarising feature and artefact sequences.
* Archive descriptions of contexts, grouped by phase (not for publication)
* Deposit sequence summary (for publication/deposition)
* Colour photographs of trenches and of archaeological features and finds
* Laboratory reports and summaries of dating and environmental data, with collection methodology.
* A consideration of the results of the field-work within the wider research context (ref. NERRF).
* Recommendations for further work on site, or further analysis of finds or environmental samples
* Copy of this specification

4. One bound and collated copy of the report needs to be submitted:

- for deposition in the County HER at the address on the first page.

Four digital copies (pdf of the report on CD) must be submitted:

- one for the commissioning client

- one for the planning authority (Gateshead Council) – this must be formally submitted by the developer to the planning department with the appropriate fee.

- one for deposition in the County HER at the address below. This CD will also include all of the digital images as TIFFs and the accompanying metadata.

PLEASE DO NOT ATTACH THE HER'S CD TO THE PAPER REPORT AS THEY ARE STORED SEPARATELY

The report and CD for the HER must be sent by the archaeological consultant or their client directly to the address below. If the report is sent via the planning department, every page of the report will be stamped with the planning application number which ruins the illustrations. The HER is also often sent a photocopy instead of a bound colour original which is unacceptable.

Publication

If significant archaeological features are found during the evaluation, the results may also warrant publication in a suitable archaeological journal. The tender should therefore include an estimated figure for the production of a short report of, for example 20 pages, in a journal such as Archaeologia Aeliana, the Arbeia Journal, Industrial Archaeology Review or Durham Archaeological Journal. This is merely to give the commissioning client an indication of potential costs.

Before preparing a paper for publication, the archaeological contractor must discuss the scope, length and suitable journal with the County Archaeologist.

Archive Preparation and Dissemination

The archive should be a record of every aspect of an archaeological project – the aims and methods, information and objects collected, results of analysis, research, interpretation and publication. It must be as complete as possible, including all relevant documents, records, data and objects {Brown, 2007, 1}.

The site archive (records and materials recovered) should be prepared in accordance with Managing Archaeological Projects, Second Edition, 5.4 and appendix 3 (HBMC 1991), MoRPHE Project Planning Notes 2006 PPN3 – Archaeological Excavation, "Archaeological documentary archives" IFA Paper No. 1, "Archaeological Archives – creation, preparation, transfer and curation" Archaeological Archives Forum etc., Guidelines for the Preparation of Excavation Archives for Long Term Storage (UKIC 1990) and "Archaeological Archives – A guide to best practice in creation, compilation, transfer and curation" by Duncan H. Brown, Archaeological Archives Forum, July 2007.

Documentary Archive

The documentary archive comprises all records made during the archaeological project, including those in hard copy and digital form.

This should include written records, indexing, ordering, quantification and checking for consistency of all original context sheets, object records, bulk find records, sample records, skeleton records, photographic records (including negatives, prints, transparencies and x-radiographs), drawing records, drawings, level books, site note-books, spot-dating records and conservation records, publication drafts, published work, publication drawings and photographs etc.

A summary account of the context record, prepared by the supervising archaeologist, should be included.

All paper-based material must at all times be stored in conditions that minimise the risk of damage, deterioration, loss or theft.

Do not fold documents

Do not use self-adhesive labels or adhesive or tape of any kind

High quality paper (low-acid) and permanent writing materials must be used.

Original drawings on film must be made with a hard pencil, at least 4H.

Do not ink over original pencil drawings.

Use polyester based film for drawings (lasts longer than plastic).

Store documents in acid-free, dust-proof cardboard boxes

Store documents flat

All documents must be marked with the project identifier (e.g. site code) and/or the museum accession number.

All types of record must use a consistent terminology and format.

Use non-metal fastenings, and packaging and binding materials that ensure the longevity of documents.

Copies of reports and appropriate drafts, with associated illustrative material, must be submitted for inclusion with the archive.

Material Archive

The material archive comprises all objects (artefacts, building materials or environmental remains) and associated samples of contextual materials or objects.

All artefacts and ecofacts retained from the site must be packed in appropriate materials.

All finds must be cleaned as appropriate to ensure their long-term survival

All metal objects retained with the archive must be recorded by x-radiograph (except gold or lead alloys or lead alloys with a high lead content and objects too thick to be x-rayed effectively e.t.c.)

The archive should include all environmental remains recovered from samples or by hand, all vertebrae remains not used for destructive analysis, environmental remains extracted from specialist samples (such as pollen preparations in silicone oil).

All finds must be marked or labelled with the project and context identifiers and where relevant the small-finds number

Use tie-on rot-proof labels where necessary

Bulk finds of the same material type, from the same context, may be packed together in stable paper or polythene bags

Mark all bags on the outside with site and context identifiers and the material type and include a polyethylene label marked with the same information

Use permanent ink on bags and labels

Sensitive finds must be supported, where appropriate, on inert plastic foam or acid-free tissue paper. It is not advisable to wrap objects in tissue as the unwrapping could cause damage.

The archive will be placed in a suitable form in the appropriate museum (typically the Museum of Antiquities for Newcastle (stores in Bedson Building and at Team Valley) and Tyne and Wear Museums for the rest of Tyne and Wear (check with these institutions) with the landowner's permission. Contact Andrew Parkin at the Museum of Antiquities (0191 2228996) and Alex Croom at Tyne and Wear Museums (0191 4544093).

A letter will be sent to the County Archaeology Officer within six months of the report having been submitted, confirming where the archive has been deposited.

Digital Archive

Copy of the report on CD as a pdf plus all of the digital images as TIFFs.

See MoRPHE Technical Guide 1 – Digital Archiving & Digital Dissemination 2006.

Archaeology Data Service
The digital archive including the image files can, if the appointed archaeologist and commissioning client choose to, be deposited with the ADS (The Archaeology Data Service) which archives, disseminates and catalogues high quality digital resources of long-term interest to archaeologists. The ADS will evaluate datasets before accepting them to maintain rigorous standards (see the ADS Collections Policy). The ADS charge a fee for digital archiving of development-led projects. For this reason deposition of the images with the ADS is optional.

Archaeology Data Service
Department of Archaeology
University of York
King's Manor
York
YO1 7EP
01904 433 954 Web: http://ads.ahds.ac.uk

SIGNPOSTING

OASIS

The Tyne and Wear County Archaeologist supports the Online Access to the Index of Archaeological Investigations (OASIS) project. This project aims to provide an online index/access to the large and growing body of archaeological grey literature, created as a result of developer-funded fieldwork.

The archaeological contractor is therefore required to register with OASIS and to complete the online OASIS form for their evaluation at http://www.oasis.ac.uk/. Please ensure that tenders for this work takes into account the time needed to complete the form.

Once the OASIS record has been completed and signed off by the HER and NMR the information will be incorporated into the English Heritage Excavation Index, hosted online by the Archaeology Data Service.

The ultimate aim of OASIS is for an online virtual library of grey literature to be built up, linked to the index. The unit therefore has the option of uploading their grey literature report as part of their OASIS record, as a Microsoft Word document, rich text format, pdf or html format. The grey literature report will only be mounted by the ADS if both the unit and the HER give their agreement. The grey literature report will be made available through a library catalogue facility.

Please ensure that you and your client understand this procedure. If you choose to upload your grey literature report please ensure that your client agrees to this in writing to the HER at the address below.

For general enquiries about the OASIS project aims and the use of the form please contact: Mark Barratt at the National Monuments Record (tel. 01793 414600 or oasis@english-heritage.org.uk). For enquiries of a technical nature please contact: Catherine Hardman at the Archaeology Data Service (tel. 01904 433954 or oasis@ads.ahds.ac.uk). Or contact the Tyne and Wear Archaeology Officer at the address below.

The tender

Tenders for the work should contain the following:-

1. Brief details of the staff employed and their relevant experience
2. Details of any sub-contractors employed
3. A quotation of cost, broken down into the following categories:-
   * Costs for the excavation, incl. sub-headings of staff costs on a person-day basis, transport, materials, and plant etc.
   * Post-excavation costs, incl. storage materials
   * Cost of Environmental analysis and scientific dating per sample
   * Estimated cost for full publication of results in an archaeological journal
   * Overheads
4. An indication of the required notification period (from agreement to start date) for the field-work; the duration of fieldwork and the expected date for completion of the post-excavation work (a maximum of 6 months after completion of the fieldwork)

Monitoring

The Archaeological Contractor will inform the County Archaeologist of the start and end dates of the excavation to enable the CA to monitor the work in progress.

Should important archaeological deposits be encountered, the County Archaeologist must be informed. If further archaeological evaluation is required on this site, then the archaeological contractor must submit a written scheme of investigation for approval by the CA before extending the size of the trenches.

APPENDICES

1 Environmental Sampling, Scientific Analysis and Scientific Dating

This is a compulsory part of the evaluation exercise.

Advice on the sampling strategy for environmental samples and samples for scientific dating etc. must be sought from Jacqui Huntley, English Heritage Regional Advisor for Archaeological Science (07713 400387) **before** the evaluation begins. The sampling strategy should include a reasoned justification for selection of deposits for sampling.

Scientific investigations should be undertaken in a manner consistent with "The Management of Archaeological Projects", English Heritage 1991 and with "Archaeological Science at PPG16 Interventions: Best Practice for Curators and Commissioning Archaeologists", English Heritage, 2004. See also 'Environmental Archaeology: A guide to the theory and practice of methods, from sampling and recovery to post excavation, English Heritage, 2002.

English Heritage guidance documents on archaeological science can be downloaded as pdf files from www.helm.org.uk or www.English-Heritage.org.uk > Learning and Resources > Publications > Free Publications.

See also the Environmental Archaeology Bibliography (EAB):
http://ads.ahds.ac.uk/catalogue/specColl/eab_eh_2004/

and the NMR sciences thesaurus:

http://thesaurus.english-heritage.org.uk/thesaurus.asp?thes_no=560

There must be full specialist liaison throughout the project – this need not necessarily be face-to-face.

Sampling should be demonstrated to be both fit for purpose and in-line with the aims and objectives of the project.

The choice of material for assessment should be demonstrated as adequate to address the objectives.

Evaluations and assessment of scientific material should provide clear statements of their potential and significance in addition to descriptive records. These statements should relate to the original objectives but may also lead to new or modified objectives.

Post excavation analysis and interpretation requires sufficient information exchange and discussion to enable scientific specialists to interpret their material within the established intellectual framework.

Archaeological and scientific analyses should be integrated as fully as possible. It is not acceptable to leave the scientific analyses simply as appendices.
Archive reports should include full data from all specialist materials. All reports, including any publications, must present sufficient primary data to support the conclusions drawn.

{From '10 principles of good practice in archaeological science' by English Heritage 2010}.

Types of sample

Flotation samples are used to recover charred and mineral-replaced plant remains, small bones, industrial residues etc. Such samples should be whole earth, 40-60 litres or 100% of small features. The flot mesh size should be 0.25-0.3mm. The residue sieve size should be 0.5-1mm. The flot and <2mm residue should be sorted under the microscope. >2mm residues can be sorted by eye.

Coarse-sieved samples are used to recover small bones (such as bird and fish), bone fragments, molluscs and small finds (beads, pottery, coins etc). Such samples should be 100 or more litres, wet or dry sieved, minimum mesh 2mm. Specialist advice is recommended.

Other types of sample are monoliths, specialist, cores and small spot. These are taken for specific reasons and need specialists.

Aims and objectives

Aims of environmental sampling – to determine the abundance/concentration of the material within the features and how well the material is preserved, to characterise the resource (the site) and each phase, to determine the significance of the material and its group value, what crop processing activities took place on the site? What does this tell us about the nature of the site? Is there any evidence for changes in the farming practice through time? How did people use this landscape? Can we place certain activities at certain locations within the site? Function and date of individual features such as pits, hearths etc. Are the charred assemblages the result of ritual deposition or rubbish? Is the charcoal the result of domestic or industrial fuel?

Deposits should be sampled for retrieval and assessment of the preservation conditions and potential for analysis of biological remains (English Heritage 2002). Flotation samples and samples taken for coarse-mesh sieving from dry deposits should be processed at the time of fieldwork wherever possible. Sieving recovers fish, amphibian, small bird and mammal bone, small parts of adult mammals and young infused bones which may be under-represented otherwise. However it is noted that sticky clay soils in this region make sieving difficult. Discuss the potential for sieving with Regional Advisor for Archaeological Science.

Environmental samples (bulk soil samples of 30-40 litres volume) will be collected by the excavator from suitable (i.e. uncontaminated) deposits. It is suggested that a large number of samples be collected during evaluation from which a selection of the most suitable (uncontaminated) can be processed. All tenders will give a price for the assessment, full analysis, report production and publication per sample.

The full 30-40 litre sample must be assessed by the laboratory, not just a small sub-sample.

The following information should be provided with the environmental samples to be processed – brief account of nature and history of the site, aims and objectives of the project, summary of archaeological results, context types and stratigraphic relationships, phase and dating information, sampling and processing methods, sample locations, preservation conditions, residuality/contamination etc.

Laboratory processing of samples shall only be undertaken if deposits are found to be reasonably well dated, or linked to recognisable features and from contexts the derivation of which can be understood with a degree of confidence.

A range of features, and all phases of activity, need to be sampled for charred plant remains and charcoal. Aceramic features should not be avoided as the plant remains from these features may help to date them. Deep features should be sampled in spits to pick up changes over time. Part or all of each of the contexts should be processed. In general samples should be processed in their entirety. All flots should be scanned, and some of the residues.

Scientific Dating

Deposits will be assessed for their potential for radiocarbon, archaeomagnetic and Optically Stimulated Luminescence dating.

See ‘Archaeomagnetic Dating: Guidelines on producing and interpreting archaeomagnetic dates’, English Heritage, 2006 and

‘Luminescence Dating: guidelines on using luminescence dating in archaeology’, English Heritage, 2008.

Timbers will be assessed for their potential for dendrochronology dating. Sampling should follow procedures in “Dendrochronology: guidelines on producing and interpreting dendrochronological dates”, Hillam, 1998.

All tenders will quote the price of these techniques per sample.

Pollen

Pollen samples can be taken from features such as lakes, ponds, palaeochannels, estuaries, saltmarshes, mires, alluvium and colluvium, and from waterlogged layers in wells, ditches and latrines etc. Substances such as honey, beer or food residues can be detected in vessels. Activities such as threshing, crop processing and the retting of flax can be identified. When taken on site, pollen samples should overlap. Your regional science advisor can advise on the type of corer or auger

which would be most appropriate for your site. Samples need to be wrapped in clingfilm and kept dark and cool. Make a description of the sediments in which the pollen was found, and send this with the sample to be assessed.

Forams and diatoms

Coastal or estuary sites (even those which are now well drained) are suitable for sampling for foraminifera. Diatoms can also be found on marine sites, but also in urban settings (sewers, wells, drains, ditches etc). They only survive in waterlogged conditions. These aquatic microfossils are used as proxy indicators of the former aquatic ecological conditions on site, changes in sea levels and temperature, salinity, PH and pollution. Forams are taken from cores, monolith tins or bulk samples. Diatoms are cut from monolith tins or cores or taken as spot samples.

Insects

Insects, which are useful as palaeoenvironmental indicators, survive best in waterlogged deposits such as palaeochannels and wells. They can provide information on climate change and landscape reconstruction as some species are adapted to particular temperatures, habitats or even particular trees. Certain insects can indicate the function of a feature or building (eg. Weevils, which were introduced by the Romans, often indicate granary sites, parasites will indicate the presence of particular animals such as sheep or horse, latrine flies survive in the mineral deposits in latrines, or in the daub of medieval buildings etc). Samples need to be sealed (eg. in a plastic box).

Industrial Activity

Where there is evidence for industrial activity, macroscopic technological residues should be collected by hand. Separate samples should be collected for micro-slags (hammer-scale and spherical droplets). Guidance should be sought from the English Heritage Regional Science Adviser on the sampling strategy for metalworking features and advice on cleaning and packaging. Specialist on-site advice must be sought on identification of metalworking features. Slag and metal working debris must be assessed by a specialist. Scientific analysis (such as x-ray fluorescence, chemical analysis, metallography or scanning electron microscope) of slag can provide information on the melting temperature, chemical composition (is it iron, zinc, copper etc), microstructure (the type and shape of the crystals), physical properties (the hardness or viscosity), isotopic composition (strontium_87 or strontium_88 etc) and mineralogical composition.

See “Archaeomagnetic dating”, English Heritage, 2006

“Guidelines on the X-radiography of archaeological metalwork”, English Heritage, 2006.

Historical Metallurgy Society, 2008, “Metals and metalworking: a research framework for archaeometallurgy”.

Centre for Archaeology Guidelines on ‘Archaeometallurgy’ 2001.

'Science for Historic Industries: Guidelines for the investigation of 17th to 19th century industries', English Heritage, 2006.

Buried soils and sediments

Buried soils and sediment sequences should be inspected and recorded on site by a recognised geoarchaeologist. Procedures and techniques in the English Heritage document "Environmental Archaeology", 2002 and "Geoarchaeology", 2004 should be followed.

See also 'Geoarchaeology. Using earth sciences to understand the archaeological record', English Heritage, 2007.

Wood

Sampling strategies for wooden structures should follow the methodologies presented in "Waterlogged wood. Guidelines on the recording, sampling, conservation and curation of waterlogged wood" R. Brunning, 1996. If timbers are likely to be present on your site, contact a wood specialist beforehand. Pre-excavation planning – determine questions to ask, agree on a sampling strategy, allocate reasonable time and budget. Soil samples should be taken of the sediments surrounding the timber. Keep the timbers wet! Record them asap on-site – plan, photograph, record the size and orientation of the wood (radial, tangential,transverse), any toolmarks, joints, presence of bark, insect damage, recent breaks, and if another piece of wood was on top of or below the piece sampled. Both vertical and horizontal positioning of wattling must be recorded. Wood samples can provide information on woodland management such as medieval coppicing, type of taxa (native or foreign), conversion technology (how the wood was turned into planks), building techniques and type of tools used.

Suitable samples should be submitted for dendrochronological dating. See English Heritage guidelines, 2004, "Dendrochronology".

Leather and organic materials

Waterlogged organic materials should be dealt with following recommendations in "Guidelines for the care of waterlogged archaeological leather", English Heritage and Archaeological Leather Group 1995.

Glass

As glass-making furnaces are above ground structures, they rarely survive. However sample residues can produce glass fragments which define glass working even though no traces of furnaces survive.
Excavations at Whitby Abbey recovered glassworking waste from preliminary sampling. Targeted bulk sampling in subsequent years recovered more evidence for glass working. Raw glass, twisted rods of glass and a possible glass inlay for an illustrated book were found. Similar glass rods were found at St. Gregory's Minster at Kirkdale, North Yorkshire.

Analysis can find out where glass was imported from (a lot of Roman glass came from Alexandria).

Analysis of the composition of glass can show varying additives and salt composition. At Whitby Abbey the varying salt composition in glass throughout the Early Medieval period reflected climate change.

Is the glass made from recycled glass waste or raw materials?

Is there evidence of glass blowing?

English Heritage has guidance forthcoming in 2010.

2 Animal Bone

Animal bone can explore themes such as hunting and fowling, fishing, plant use, trade network, seasonality, diet, butchery, animal husbandry, food procurement, age structures, farrowing areas, species ratios, local environment.

Domestic animal bone was used in prehistoric and Roman cremation rituals.

Post medieval cattle bones – small cow bones invariably represent animals which produced high quality buttermilk for cheese. Big 'improved' cattle with large bones were produced for large quantities of meat and poorer quality milk. Large and small cattle bones are often found together on post medieval sites, usually with less of the small bones.

Animal bone assemblages should be assessed by a recognised specialist.

The specialist will need to know a brief account of the nature and history of the site, an account of the purpose, methods (details of sampling) for recovery of animal bones, and the main aims and results of the excavation, details of any specific questions that the excavator wants the animal bone specialist to consider, information about other relevant finds from the excavation (e.g. bone tools, fishing equipment, weaving equipment), specific information about each context that has produced significant quantities of animal bone (recovery method, phase, context type, position in relation to major structures, contamination by more recent material, some indication of the amount of bone (by weight or by container size). See "Ancient Monuments Laboratory Advisory Note, "Assessment of animal bone collections from excavations", Sebastian Payne, 1991and "The Assessment of a collection of animal bones", S. Davis, n.d., Ancient Monuments Laboratory.

Fish bone

Because fish bones are so small, particularly freshwater and estuarine species, they are often only recovered in large bulk samples. Samples must always be sieved.

Roman agenda – did the Romans eat fish? Were they sourced locally or imported? Use of fish as a sauce (garum).
Excavations at Bridge Street, Chester showed that in the Roman period fish was eaten and was both locally sourced and imported (mullet and Spanish mackerel).

Medieval and post medieval agenda – evidence for the deep sea fishing 'revolution', size-biased collections, replacement or supplement of freshwater and estuarine fish in the diet by deep sea fish.

Tere was some herring exploitation in the early medieval period. Christian fasting from around 970 allowed fish to be eaten on Fridays which led to a huge demand for fish. There was an increase in marine fishing, fish trade and fish consumption (cod, haddock, ling, herring etc) around 1000 AD. Middens provide evidence of commercial fishing. There was a decline in freshwater fish (cyprinid or carp, salmon, smelt, eel, pike) from the eleventh century.

Smoking fish is a recent practice. They were previously air dried and salted.

Newcastle was a major port. Samples should be sieved to retrieve fish and bird bones along with small parts of other animal skeletons and young infused bones.

A crane bone was recovered from excavations at Tuthill Stairs, Newcastle – a rare find.

Herring bones are so small that they can only be retrieved by 2mm sieving.

Clay soils are difficult to sieve, hot water can help.

Acidic soils mean poor preservation of bone.

See English Heritage 2002, "Environmental Archaeology – a guide to the theory and practice of methods from sampling and recovery to post excavation", Centre of Archaeology Guideline 1.

Isotope analysis can determine where the fish were coming from – North Sea, Scandinavia, Newfoundland, Iceland etc.

There is an excellent reference collection of fish bone at York.

Fish bones should be archived to museums for future dating and isotope analysis where this is not undertaken as part of the post-excavation process.

www.fishlab.org

3 Human Remains

Human remains must be treated with care, dignity and respect.

Excavators must comply with the relevant legislation (essentially the Burial Act 1857) and local environmental health concerns. If found, human remains must be left in-situ, covered and protected. The archaeological contractor will be responsible for informing the police, coroner, local Environmental Health department and the County Archaeologist. If it is agreed that removal of the remains is essential, the archaeological contractor will apply for a licence from the Home Office and their regulations must be complied with.

The excavation area must be shielded from public view with screens.

The excavation of human remains is a delicate and time consuming operation. The process can take one or two days per skeleton. If the skeleton cannot be excavated all in one day cover it with plastic sheeting overnight to prevent it from drying out. The remains should be excavated as completely as possible to give the bioarchaeologist the maximum amount of data.

A bioarchaeologist should be employed for any burial excavation from the start of the project.

A basic diagram of a skeleton should be available on site for staff to consult (such as that in Abrahams et al, 2008, McMinn's the human skeleton).

Once the top of a skeleton is reached, excavation will be undertaken using delicate tools such as paintbrushes, teaspoons, dental equipment and plasterers' leaves.

Recover all teeth, hand and foot bones.

Excavate the pubic symphysis of the pelvis with care as it is needed for age estimation of adults.

The ends of the ribs that meet the sternum are useful for age estimation of adults.

There will be a possibility that gall, bladder and kidney stones may survive. Sesamoid bones may be present in the hands and feet, calcified cartilages in the neck, on the ribs and on the hyoid bone in the neck.

Foetal bones may be present in the abdominal area of female skeletons.

The bones should be shaded from strong sunlight so they do not dry out and crack.

Bones should be drawn at 1:10 using a planning frame. Manual and digital photographs should be taken with a scale and a magnetic north arrow clearly visible. 3D recording using an EDM may be undertaken.

Site inspection by a recognised osteologist is desirable for isolated burials and essential for cemeteries. The remains will be recorded in-situ and subsequently lifted, washed in water (without additives). They will be marked and packed to standards compatible with "Excavation and post-excavation treatment of cremated and inhumed human remains", McKinley and Roberts, 1993. After excavation, the remains will be subject to specialist assessment.

Analysis of the osteological material should take place according to published guidelines "Human Remains from Archaeological Sites, Guidelines for producing assessment documents and analytical reports, English Heritage, 2002.

Some of the potential benefits from the study of human skeletons – demography, growth profiles, patterns of disease, genetic relationships, activity patterns, diet, burial practices, human evolution. New scientific techniques available include DNA and stable isotope analyses.

Diseases which yield ancient DNA – leprosy, syphilis, tuberculosis, mycobacterium bovis (animal form of TB passed to humans when they shared a living space from Neolithic period onwards).

Cremation destroys the crown of the tooth so it cannot be dated (the closure of the cranium vault can be used in adults for dating instead). Cremation also fragments bone, distorts it due to lack of water, shrinks the bone, causes microstructural alteration and destroys organic components (so DNA analysis not possible).

The final placing of the remains after scientific study and analysis will be agreed beforehand.

Health & Safety associated with human remains:

Micro-organisms that might cause harm to humans are extremely unlikely to survive beyond about 100 Years.

More recent remains could be more hazardous to health as they may be in sealed lead coffins.

The possible risks of contracting disease from excavated human remains are highly negligible but could include the virus smallpox, tetanus and anthrax spores, the bacterial infection leptospirosis and the fungal disease mycoses (a problem in dry dusty soils and in crypts).

Excavators should be up-to-date with tetanus inoculations.

Anthrax can come from materials derived from animals – coffin pads, pillows or coffin packing.

Working with human remains may cause psychological stress (see J. Thompson, 1998, Bodies, minds and human remains, in M. Cox (ed) 1998, Grave concerns: Death and Burial in England 1700-1850, pp 197-201).

There is a danger of lead poisoning arising from high levels of lead in the atmosphere generated by lead coffins (see H. Needleman, 2004, Lead poisoning in Annual Review of Medicine, 55, pp. 209-22).

Normal hygiene measures should be undertaken – washing hands, wearing masks and gloves. Heavily soiled clothing should be burned at an HSE approved site.

Further guidance is available in:

“Guidance for best practice for treatment of human remains excavated from Christian burial grounds in England”, The Church of England and English Heritage, 2005 (www.english-heritage.org.uk/upload/pdf/16602_HumanRemains1.pdf)

“Church Archaeology: its care and management”, Council for the Care of Churches, 1999

Charlotte A. Roberts, 2009, ‘Human Remains in archaeology: a handbook’, CBA Practical Handbooks in Archaeology No. 19

The Advisory Panel on the Archaeology of Christian burials in England can provide free well-informed advice with consideration of relevant religious, ethical, legal, archaeological and scientific issues. Panel's website:
http://www.britarch.ac.uk/churches/humanremains/index.html
or email the secretary simon.mays@english-heritage.org.uk

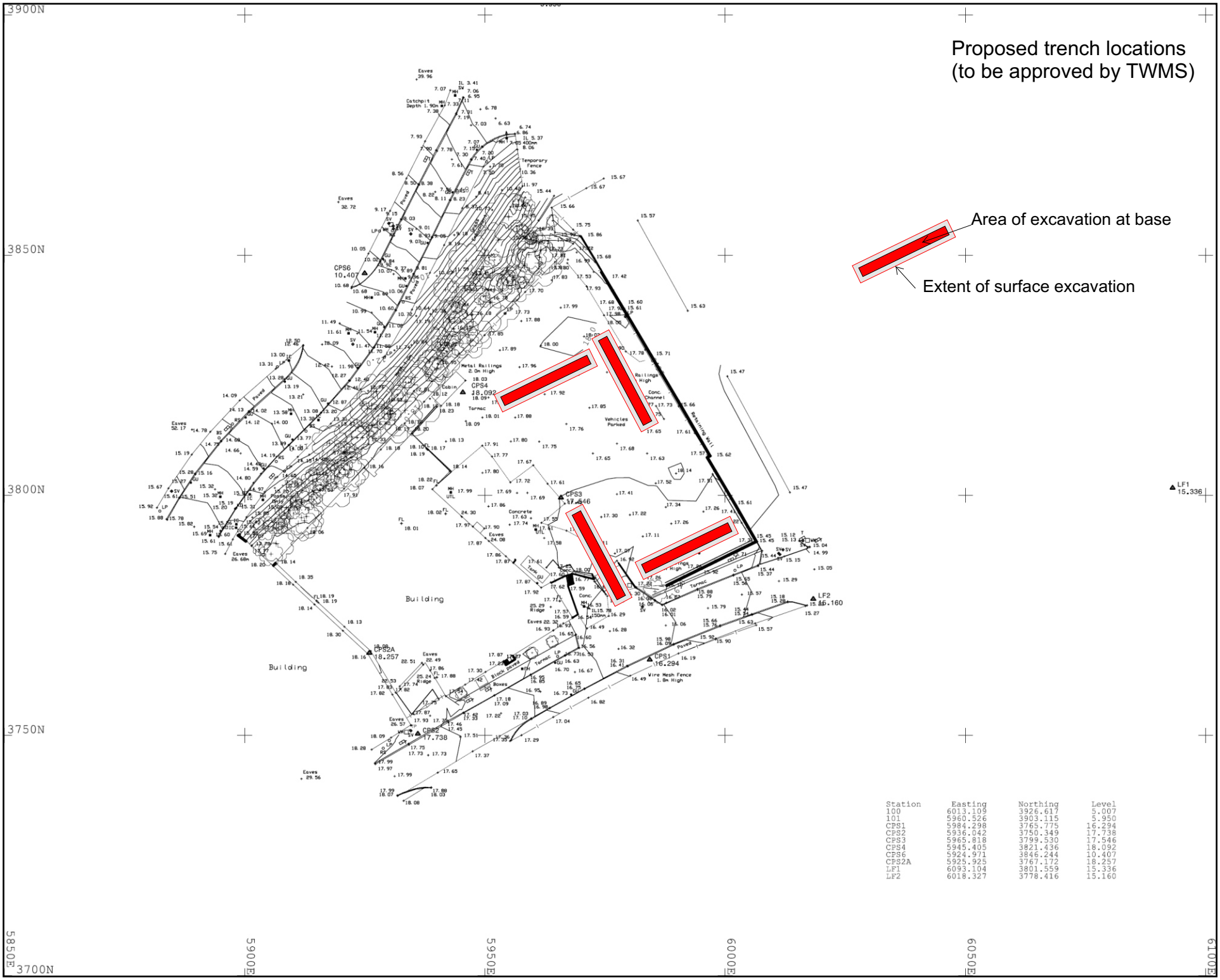
4 Treasure

Defined as:

- Any metallic object, other than a coin, provided that at least 10% by weight of metal is precious metal and that is at least 300 years old when found
- Any group of two or more metallic objects of any composition of prehistoric date that come from the same find
- All coins from the same find provided that they are at least 300 years old when found, but if the coins contain less than 10% gold or silver there must be at least ten
- Any object, whatever it is made of, that is found in the same place as, or had previously been together with, another object that is Treasure
- Any object that would previously have been treasure trove, but does not fall within the specific categories given above. Only objects that are less than 300 years old, that are made substantially of gold or silver, that have been deliberately hidden with the intention of recovery and whose owners or heirs are unknown will come into this category

If anything is found which could be Treasure, under the Treasure Act 1996, it is a legal requirement to report it to the local coroner within 14 days of discovery. The Archaeological Contractor must comply with the procedures set out in The Treasure Act 1996. Any treasure must be reported to the coroner and to The Portable Antiquities Scheme Finds Liaison Officer, Rob Collins (0191 2225076 or Robert.Collins@newcastle.ac.uk) who can provide guidance on the Treasure Act procedures.

If you need this information in another format or language, please contact Jennifer Morrison, Archaeology Officer.



Station	Easting	Northing	Level
100	6013.109	3926.617	5.007
101	5960.526	3903.115	5.950
CPS1	5984.298	3765.775	16.294
CPS2	5936.042	3750.349	17.738
CPS3	5965.818	3799.530	17.546
CPS4	5945.405	3821.436	18.092
CPS6	5924.971	3846.244	10.407
CPS2A	5925.925	3767.172	18.257
LF1	6093.104	3801.559	15.336
LF2	6018.327	3778.416	15.160

P C A

PRE - CONSTRUCT ARCHAEOLOGY LIMITED

UNIT 54

BROCKLEY CROSS BUSINESS CENTRE

96 ENDWELL ROAD

BROCKLEY

LONDON SE4 2PD

TEL: 0207 732 3925 0207 639 9091

FAX: 0207 639 9588

EMAIL: info@pre-construct.com

PRE-CONSTRUCT ARCHAEOLOGY LIMITED (NORTHERN OFFICE)

UNIT 19A

TURSDALE BUSINESS PARK

DURHAM DH6 5PG

TEL: 0191 377 1111

FAX: 0191 377 0101

EMAIL: info.north@pre-construct.com